Morrison

# DINOSAURS!

•DISCOVER THE GIANTS OF THE PREHISTORIC WORLD•

## 53

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# DINOSAURS!

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# ARRHINOCERATOPS

**In spite of its name, *Arrhinoceratops* (no nose-horned face), did have a small nose horn.**

When William Parks described *Arrhinoceratops* in 1925, he claimed that it did not have a proper nose horn. But there was a sort of bump where a nose horn would normally be found. This was made by a lumpy thickening of the bones surrounding the dinosaur's nose.

### SMALL AND STUMPY

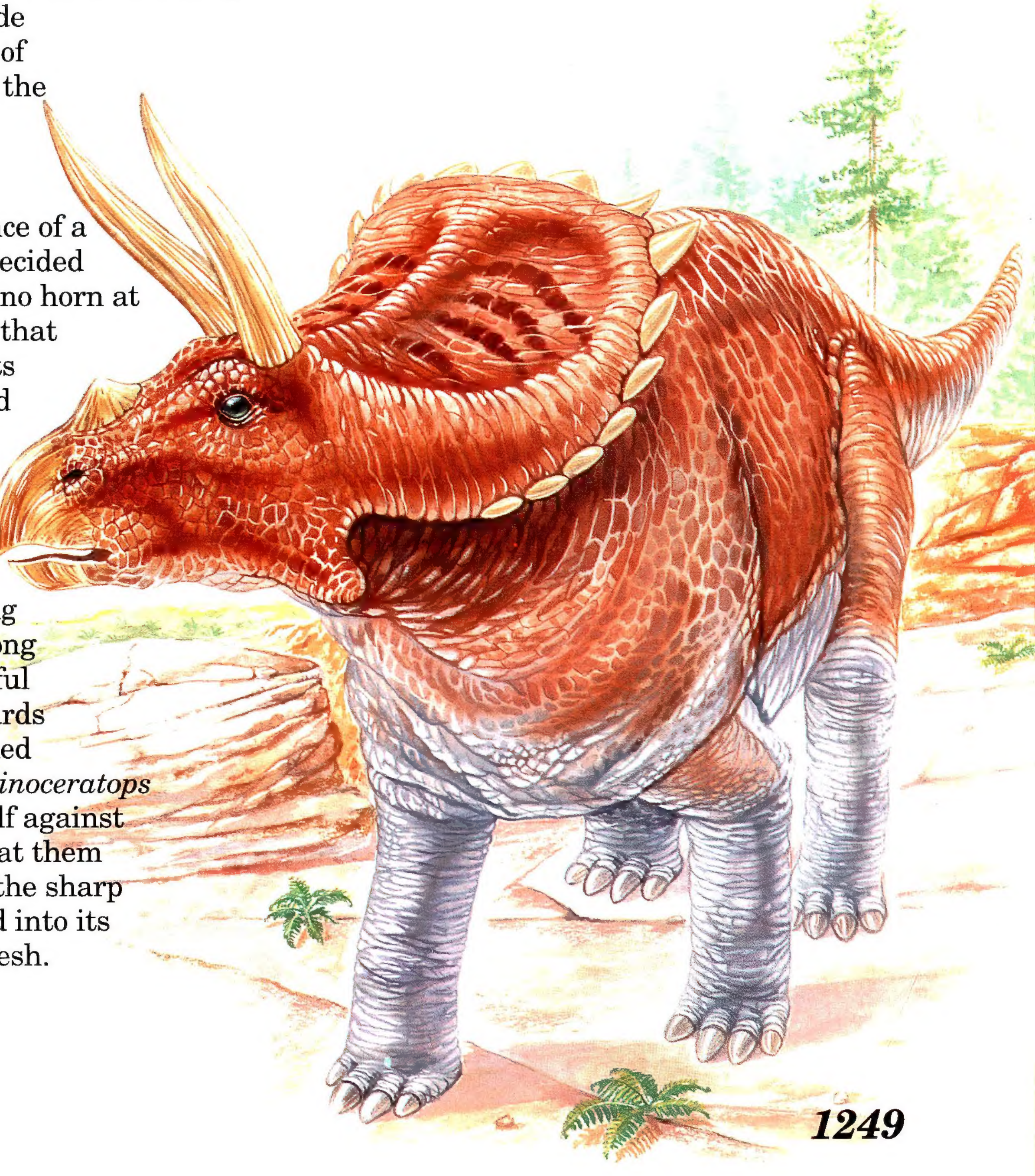
As there was no evidence of a separate bone, Parks decided that the ceratopid had no horn at all. Now experts agree that *Arrhinoceratops*, like its relative *Triceratops*, did indeed have a small stumpy nose horn.

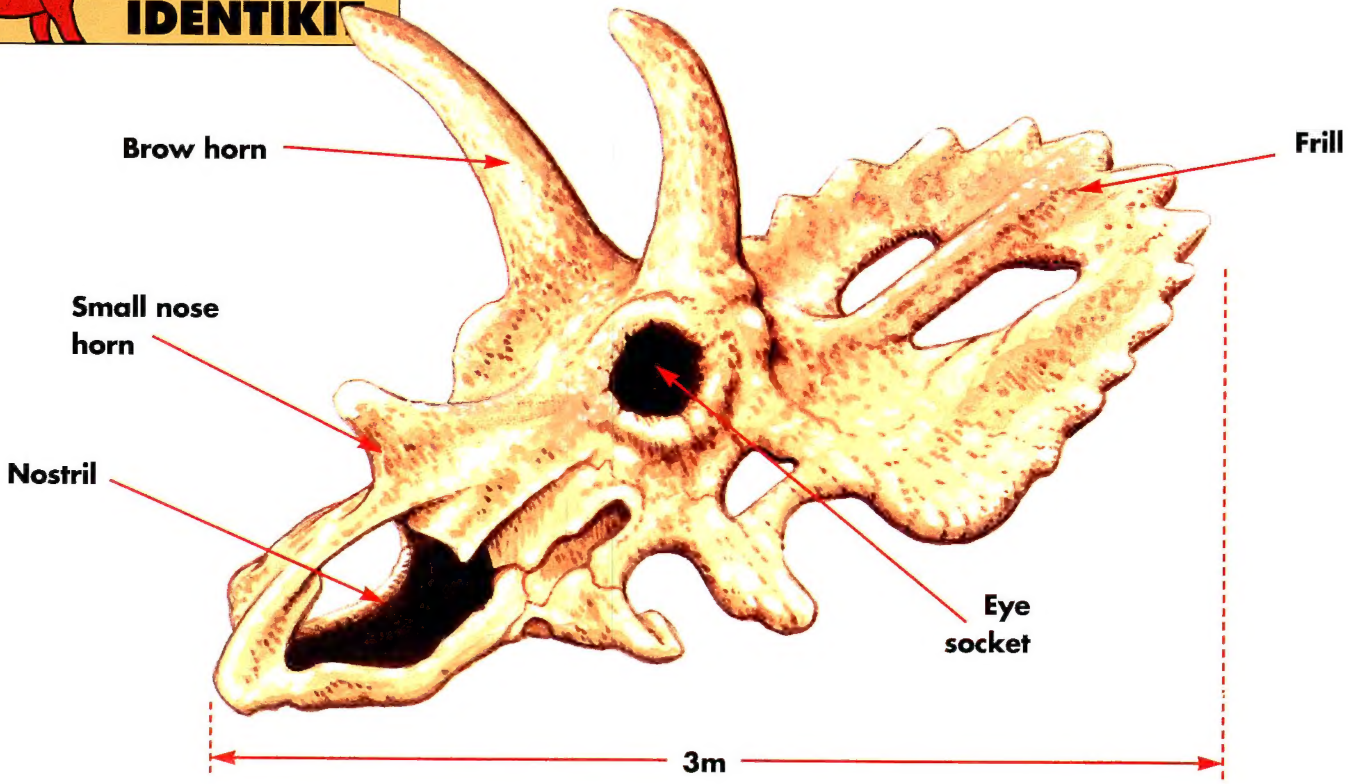
### TWO-PRONGED ATTACK

There was no mistaking *Arrhinoceratops*' two long brow horns. These useful weapons pointed forwards above its eyes and looked very threatening. *Arrhinoceratops* probably defended itself against predators by charging at them with its head down so the sharp tips of the horns ripped into its enemy's unprotected flesh.

### WINNER TAKES ALL

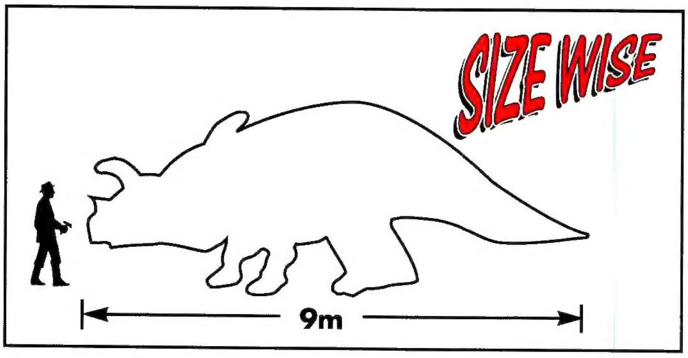
*Arrhinoceratops* also used its brow horns to fight with other males in tests of strength. The two sturdy dinosaurs locked horns and shoved their heads together until one of them was too weak to go on. The winner of this battle became the leader and was popular with females at mating time.





### WIDE AND WAVY

Like *Triceratops*, *Arrhinoceratops* had a broad neck frill. A row of rounded, bony bumps ran all along the outer edge and gave the frill a wavy outline.



## MONSTER FACTS

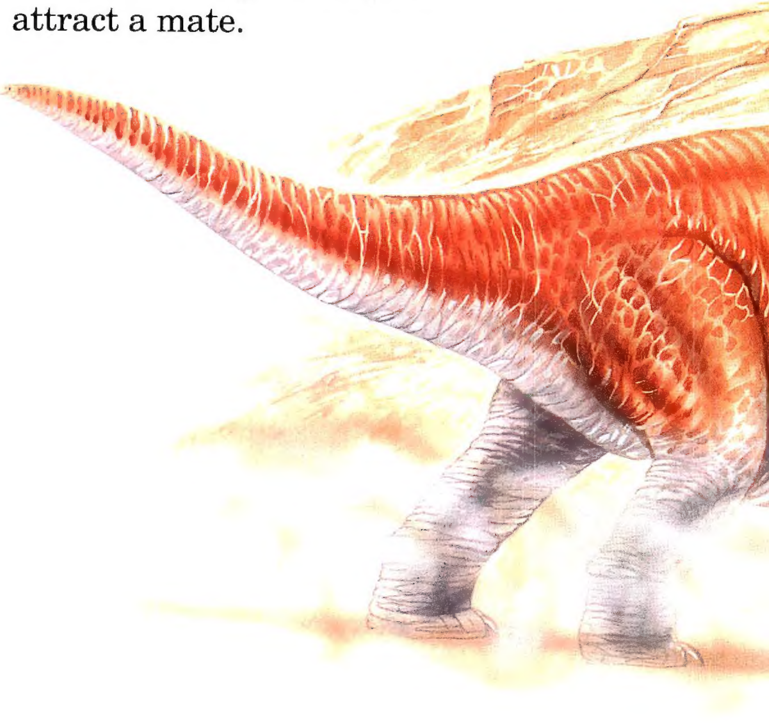
- **NAME:** *Arrhinoceratops* (a-rye-no-serra-tops) means 'no nose-horned face'
- **GROUP:** dinosaur
- **SIZE:** 9m long
- **FOOD:** plants
- **LIVED:** about 80 million years ago in the Late Cretaceous Period in Alberta, Canada

### IMPRESSIVE SHOW

When its head was up, the frill lay back against the dinosaur's shoulders. But when *Arrhinoceratops* bent its head down the frill stood up and made quite a show.

### COLOURFUL DISPLAY

Two small openings in the frill made it light and easy to move. Some experts have suggested that these frills were brightly coloured to help ceratopids attract a mate.



### LONG IN THE JAW

As it lumbered through the meadows of Alberta, *Arrhinoceratops* munched low-growing plants with its parrot-like beak. At the back of its long, tapering jaws were rows of teeth which ground down the leaves and shoots to a pulp. As they were worn down, new ones grew to replace them. *Arrhinoceratops* probably spent most of its day browsing and nibbling. It needed plenty of food to sustain its large body.

### BIG AND BULKY

*Arrhinoceratops* was almost as long as a bus and heavier than an elephant. Its bulky body and sharp horns probably put off all but the most hungry predators.

### RING OF SAFETY

Baby dinosaurs were much more at risk and experts think that ceratopids had a special way of protecting their young. *Arrhinoceratops* may have lived in herds. When predators lurked, the adults may have formed a protective circle around their young to keep them safe.

## IT'S A FACT

**Fossils**

Fossils of *Arrhinoceratops* are rare. This may be because there were very few of these dinosaurs or because *Arrhinoceratops* lived in dry upland places where fossils do not easily form.

### SOLID FRAME

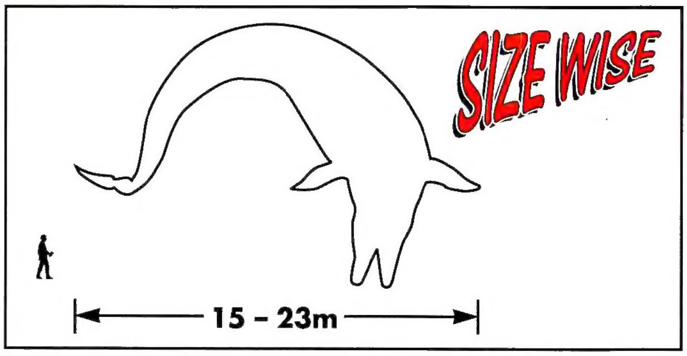
The frame of a dinosaur like *Arrhinoceratops* had to be immensely strong to support its great weight. Large bones in its neck and back were attached to powerful muscles which moved its heavy head and legs.

**The outcome of this battle between two male *Arrhinoceratops* will decide which leads the herd.**

# BASILOSAURUS

**With its snake-like body and tiny head, this sea mammal was mistakenly named 'king reptile'.**

Although it was as long as a modern whale, *Basilosaurus* did not have a bulky body and huge head. Fifty-four million years ago, it was the largest mammal and preyed on the fish and sea creatures with which it shared the ocean. A layer of blubber around its body probably ensured it did not lose too much heat.

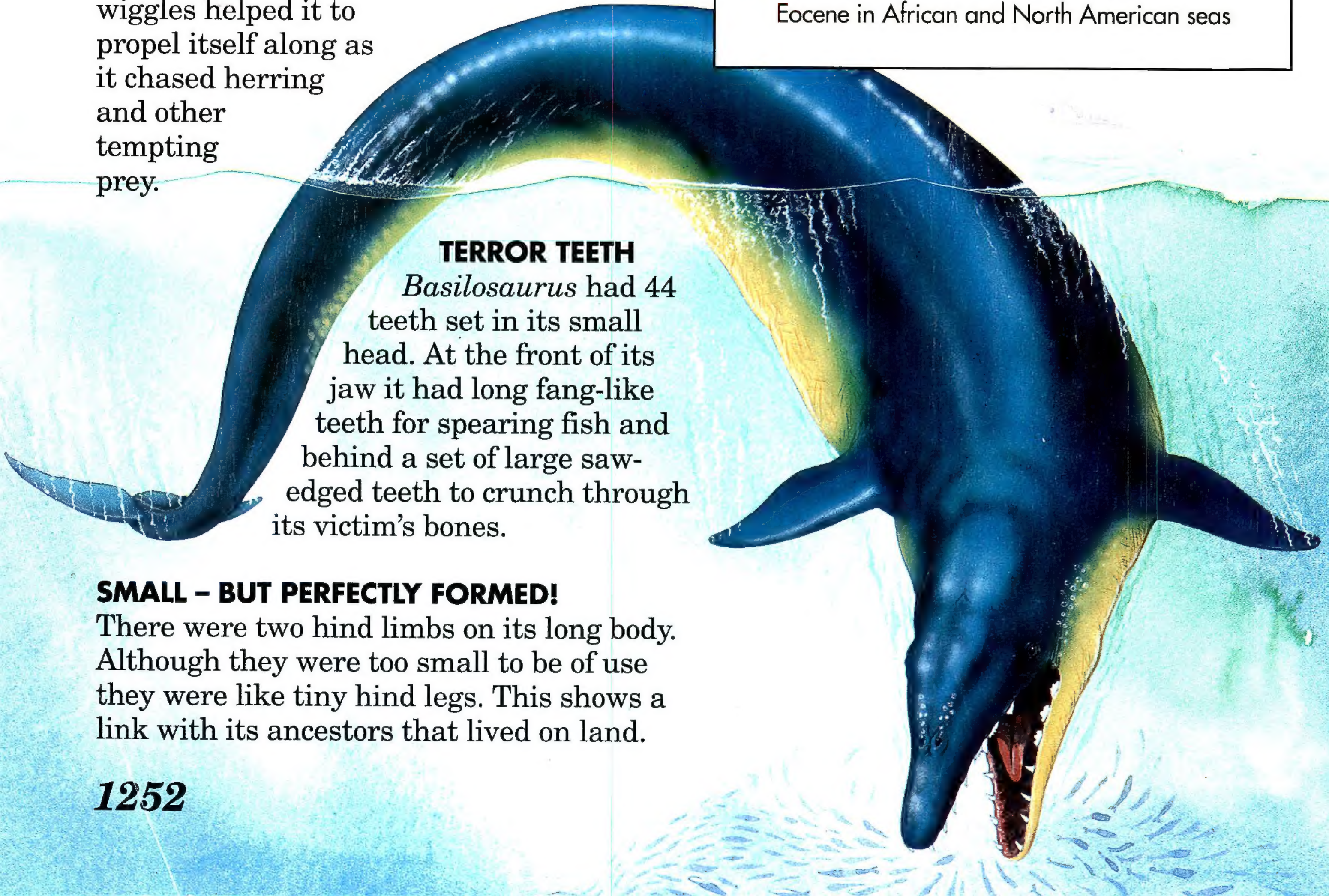


## MONSTER FACTS

- **NAME:** *Basilosaurus* (ba-zil-oh-saw-rus) means ' king reptile'
- **GROUP:** mammal
- **SIZE:** 15 – 23m long
- **FOOD:** fish
- **LIVED:** about 54 million years ago in the Eocene in African and North American seas

### MAKING WAVES

Experts think that *Basilosaurus* moved through water by curving its body in a series of wave-like movements. These wiggles helped it to propel itself along as it chased herring and other tempting prey.



### TERROR TEETH

*Basilosaurus* had 44 teeth set in its small head. At the front of its jaw it had long fang-like teeth for spearing fish and behind a set of large saw-edged teeth to crunch through its victim's bones.

### SMALL – BUT PERFECTLY FORMED!

There were two hind limbs on its long body. Although they were too small to be of use they were like tiny hind legs. This shows a link with its ancestors that lived on land.

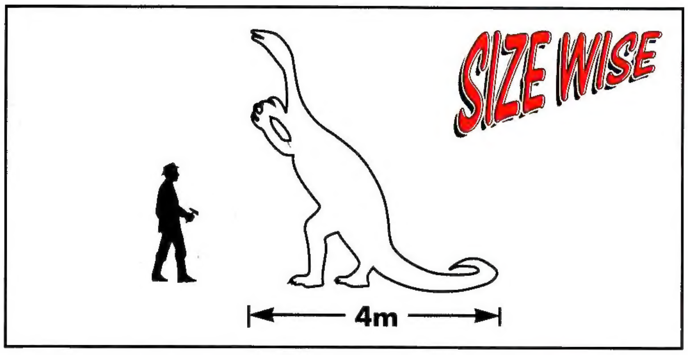
# COLORADISAURUS

***Coloradisaurus* was a plant-eating South American dinosaur, as long as a car.**

*Coloradisaurus* was named after the Los Colorados rock formation in Argentina where it was found. Scientists have had few clues to work from because only the skull and jaw have been found.

### OUT OF REACH

*Coloradisaurus* was a prosauropod and probably walked on two or four legs like *Plateosaurus*. It tipped back on to its back legs when it wanted to reach leaves and shoots from branches above its head.



### MONSTER FACTS

- **NAME:** *Coloradisaurus* (koll-or-rah-di-saw-rus) means 'Colorados reptile'
- **GROUP:** dinosaur
- **SIZE:** about 4m long
- **FOOD:** plants
- **LIVED:** about 200 million years ago in the Late Triassic Period in Los Colorados, Argentina

### WELL BALANCED

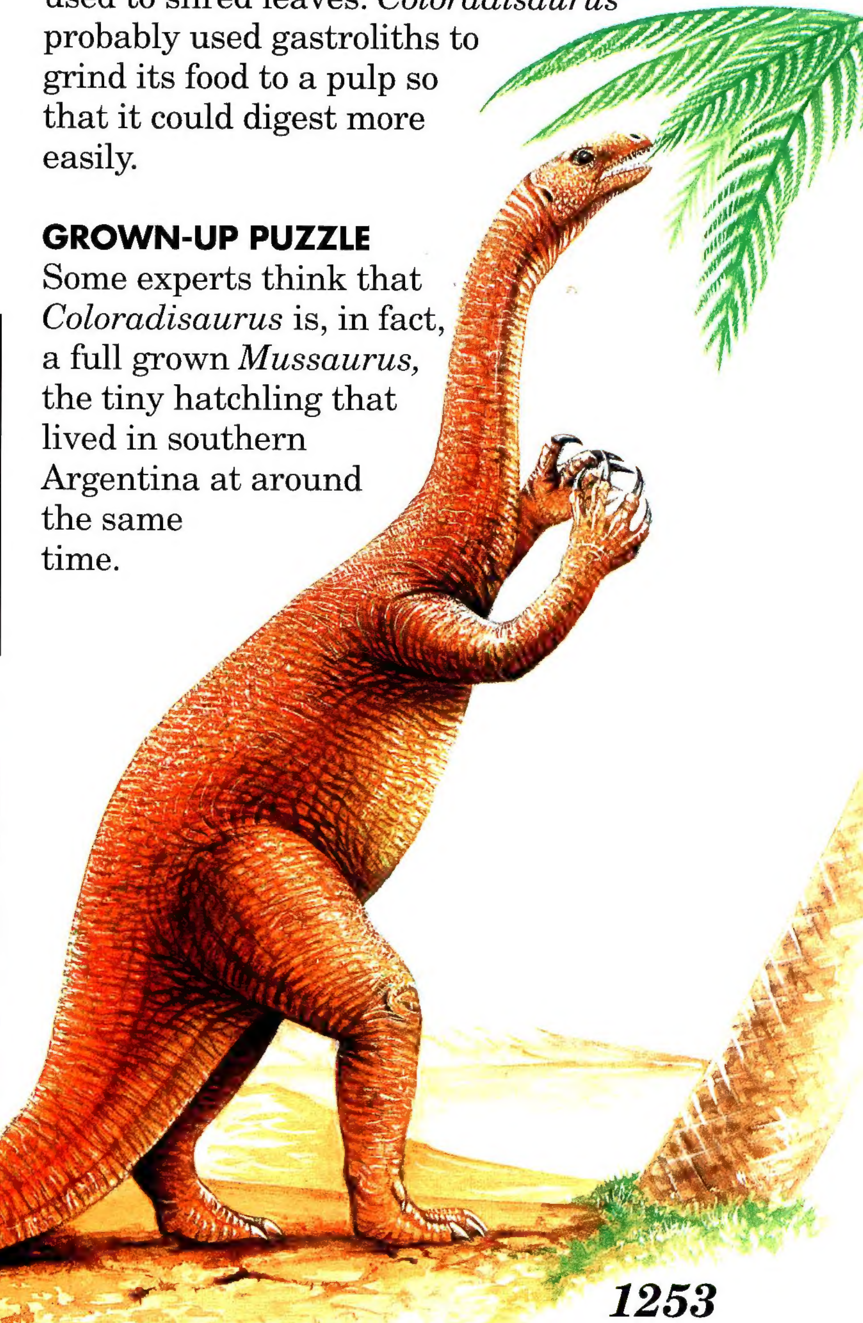
*Coloradisaurus* probably had a long and slender neck which was balanced by a tapering tail as it walked.

### SIMPLE TEETH

Like *Plateosaurus*, *Coloradisaurus* had a deep, narrow snout. But the back of its skull was much broader than its relative's. Inside its slender jaw, *Coloradisaurus* had coarse teeth with jagged edges which it used to shred leaves. *Coloradisaurus* probably used gastroliths to grind its food to a pulp so that it could digest more easily.

### GROWN-UP PUZZLE

Some experts think that *Coloradisaurus* is, in fact, a full grown *Mussaurus*, the tiny hatchling that lived in southern Argentina at around the same time.



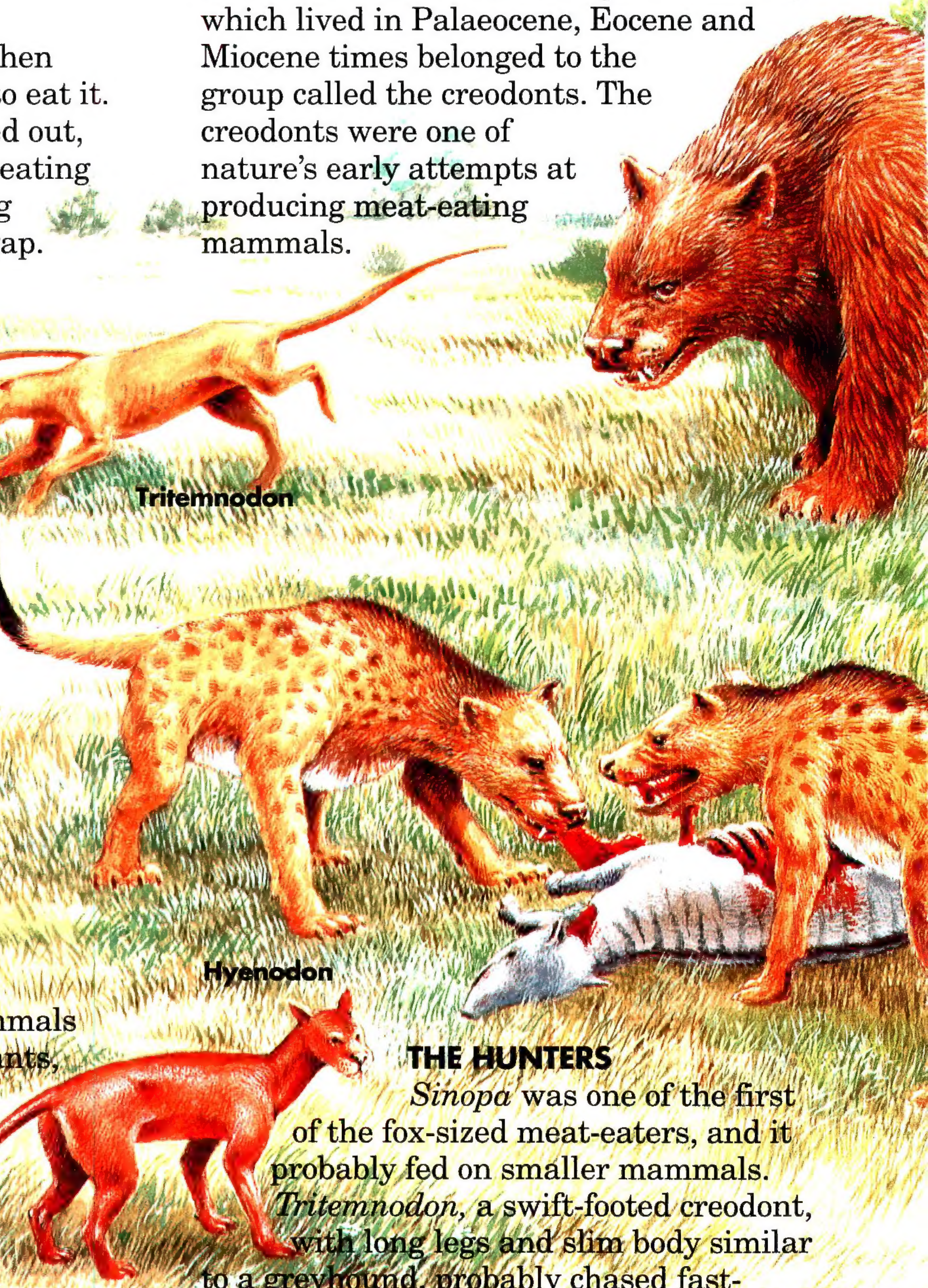
# Creodonts and other meat-eaters

**The first meat-eaters evolved in all shapes and sizes.**

If a food supply exists, then something will evolve to eat it. After the dinosaurs died out, there were plants with nothing eating them any more. The plant-eating mammals stepped in to fill the gap.

### CREODONTS FOR COURSES

All the different meat-eating mammals which lived in Palaeocene, Eocene and Miocene times belonged to the group called the creodonts. The creodonts were one of nature's early attempts at producing meat-eating mammals.



**Like these modern foxes, small creodonts hunted small meat-eaters.**

### PLANT-EATERS HUNTED

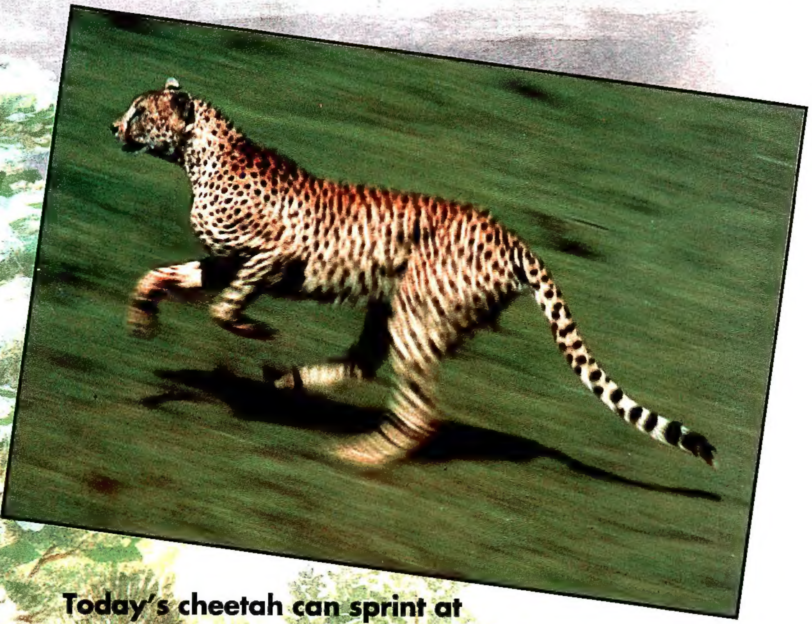
Within a few million years, mammals evolved that ate low-growing plants, bushes and trees. These plant-eating mammals themselves were a food supply. As a result many different meat-eating mammals evolved to hunt them.

### THE HUNTERS

*Sinopa* was one of the first of the fox-sized meat-eaters, and it probably fed on smaller mammals. *Tritemnodon*, a swift-footed creodont, with long legs and slim body similar to a greyhound, probably chased fast-moving prey through open woodland.

## NIGHTMARE CREODONT

There was one creodont that was perhaps the largest land-living flesh-eating mammal that ever lived. Bigger than a modern grizzly bear, with a head like that of a modern tiger but twice the size, *Megistotherium* hunted down the huge elephants and rhinoceros-like creatures that abounded in Miocene North Africa. What a monster!



**Today's cheetah can sprint at speeds of up to 100 kph – probably faster than any of the creodonts.**

**Megistotherium**

## SCAVENGER

The big heavy teeth of the creodont *Hyenodon* may have been used for tearing up the bones and flesh of dead animals, just like today's hyenas.

**Like today's hyenas, *Hyenodon* was both a killer and a scavenger.**

## WHAT HAPPENED TO THE CREODONTS?

We don't know. They were the top of the food-chain until the Miocene and then they died out, and were replaced by the modern carnivore groups. Perhaps they were less intelligent than modern types. Or maybe they did not evolve as fast as the fleet-footed grassland-dwellers. Perhaps we will never know.

### What is? A CREODONT?

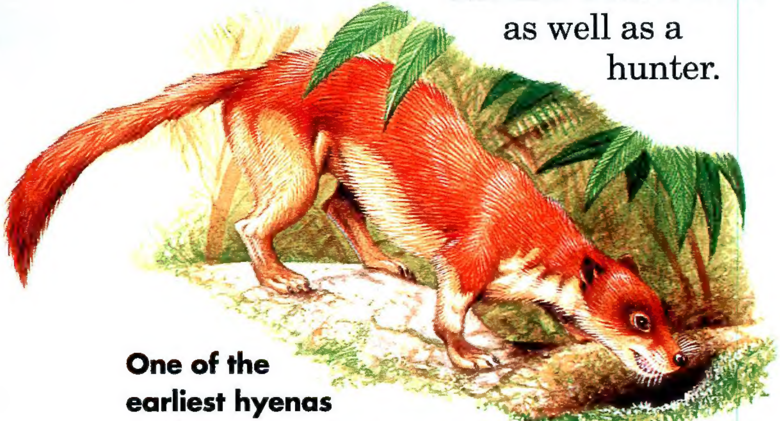
The skeleton of a creodont is like that of a modern carnivore, with its killing and meat-shearing teeth. (The name means 'flesh-tooth'.) However the foot bones are shorter – giving the animal a flat-footed appearance – and there is a split in the claw bones. Creodonts were not related to carnivores.

### TAKE OVER

So what replaced the creodonts? The modern carnivore groups did. These consist of the hyenas, the dogs, the cats, the bears, the raccoons and coatis, the weasels and otters, and the mongooses and civets. They all evolved to hunt different animals in different ways.

### TAKING WHAT'S LEFT

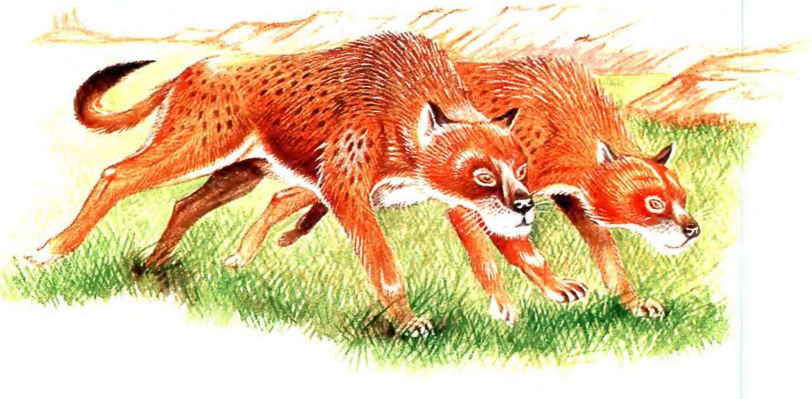
*Ictitherium* was one of the first hyenas. It was a scavenger – eating the leftovers from another animal's kill – as well as a hunter.



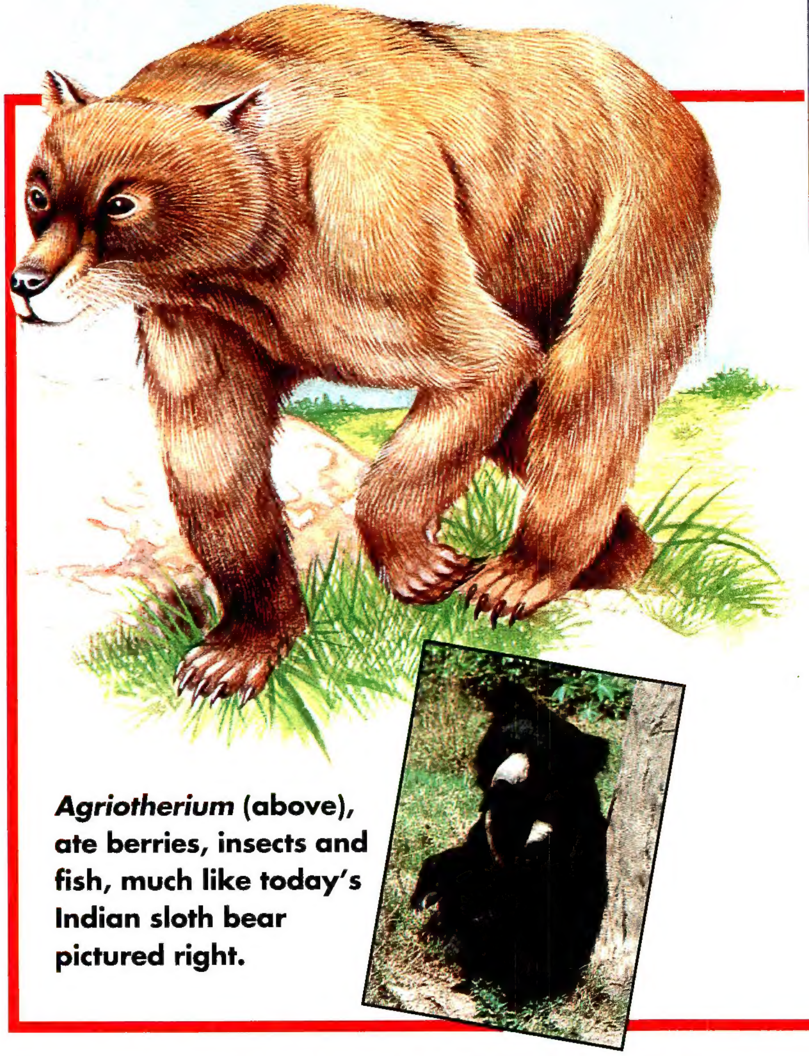
**One of the earliest hyenas *Ictitherium* looked more like today's civet.**

### TEAMWORK

The dogs, such as *Osteoborus*, opted for cooperative hunting and the later types worked in packs chasing down their prey until it collapsed exhausted.



***Osteoborus* from the Pliocene of North America was actually a dog, but it could crush up bones like a hyena.**



***Agriotherium* (above), ate berries, insects and fish, much like today's Indian sloth bear pictured right.**

## IT'S A FACT

### BEFORE THE CREODONTS

The first animals to prey on the early plant-eaters were crocodiles and giant flightless birds. Then came a group of meat-eating mammals related to today's hooved plant-eaters such as deer. Wolf-like *Mesonyx* was one of these. This group did not last long before the creodonts took over.

### STEALTH

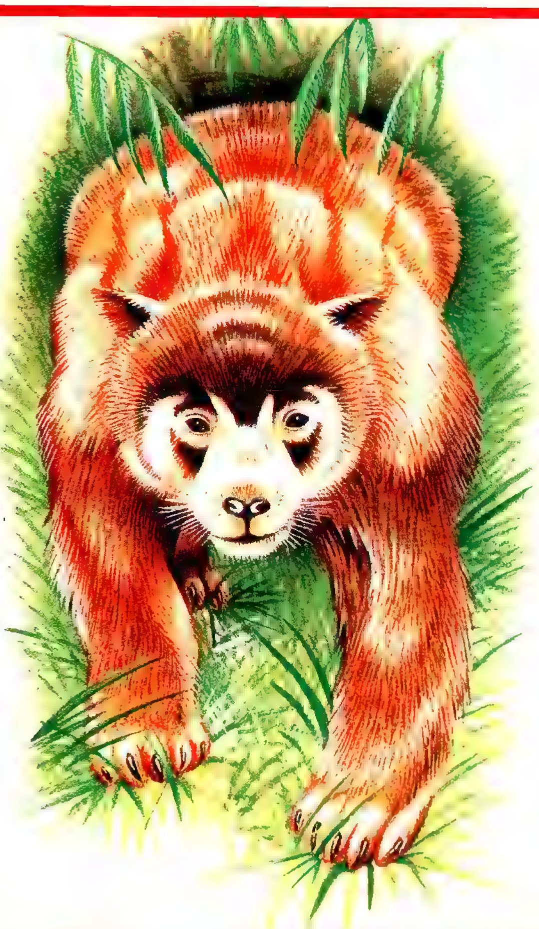
The cats became the stealthy ambushers – killing their prey swiftly with a surprise attack. The biggest mammals were hunted by the sabre-tooths of Pleistocene times.

### I'LL EAT ANYTHING

The bears, such as *Agriotherium*, turned their backs on the purely meat-eating diet of their ancestors and became omnivores. Like modern bears, *Agriotherium* ate berries, insects and fish as well as meat.

### TREE DWELLERS

Today's raccoons and coatis are basically tree-living hunting animals and so tend to be quite small in size. But *Chapalmalania* was a huge raccoon about the size of a modern giant panda. Raccoons are omnivores too.



Looking a bit like a modern panda, ***Chapalmalania*** roamed South America in Pliocene times.

***Chapalmalania*'s** modern descendant – a raccoon.

### AFTER THE LOWLIFE

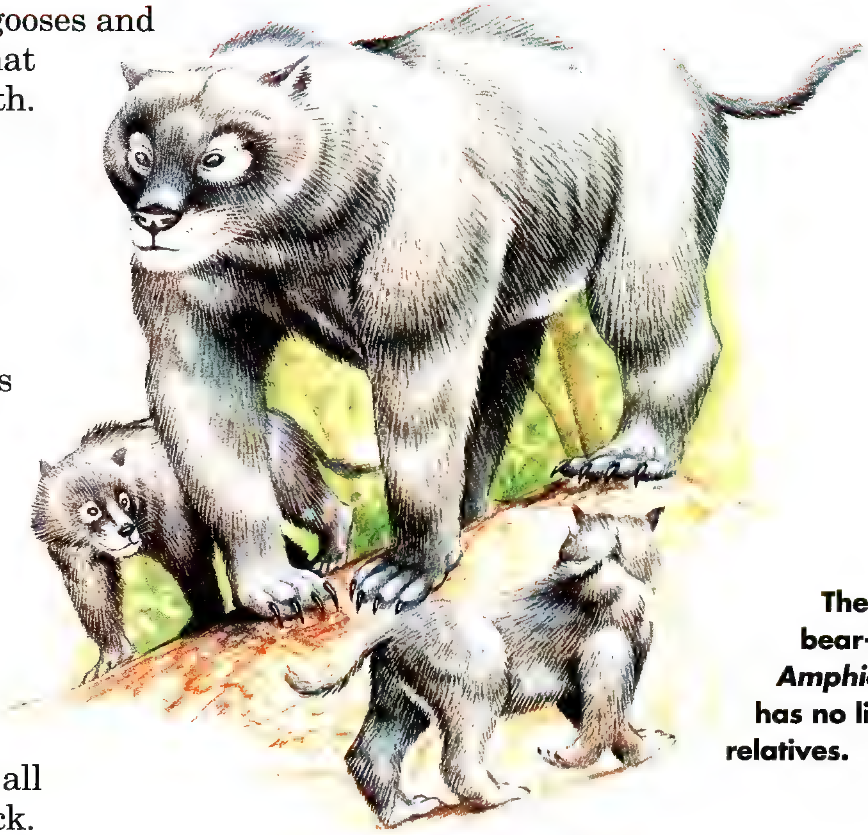
Today's weasels, stoats, mongooses and civets are small carnivores that hunt through the undergrowth.

### HALF AND HALF

One group of modern-type carnivores is now completely extinct. These are the amphicyonids which were somewhere between the bears and the dogs. *Amphicyon* lived in Europe in the Miocene.

### INTO THE WATER

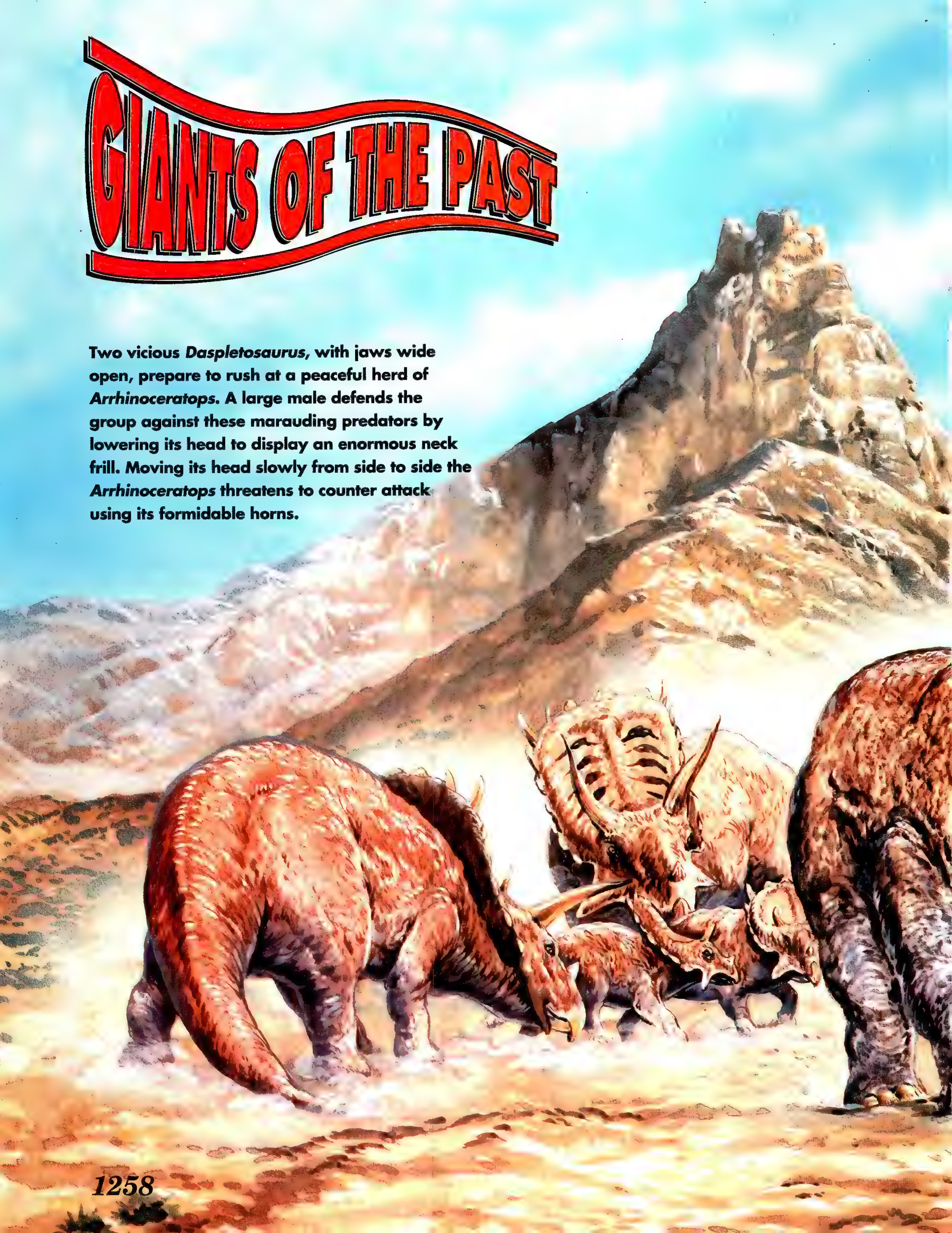
The water-living meat-eaters and fish-eaters today are also related to the carnivore group. Seals and sealions, and the whales, are all descended from the same stock.



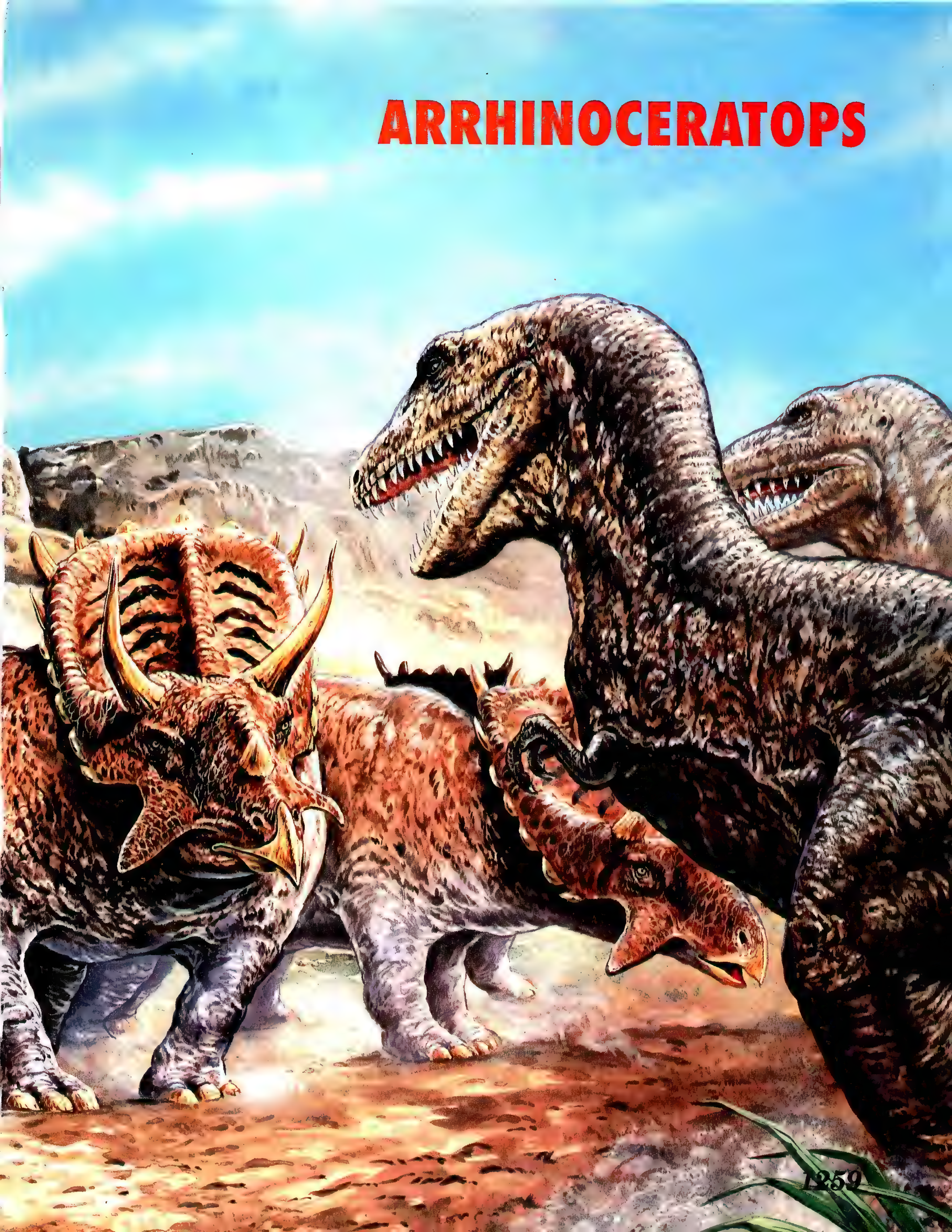
The bear-dog ***Amphicyon*** has no living relatives.

# GIANTS OF THE PAST

Two vicious *Daspletosaurus,* with jaws wide open, prepare to rush at a peaceful herd of *Arrhinoceratops.* A large male defends the group against these marauding predators by lowering its head to display an enormous neck frill. Moving its head slowly from side to side the *Arrhinoceratops* threatens to counter attack using its formidable horns.

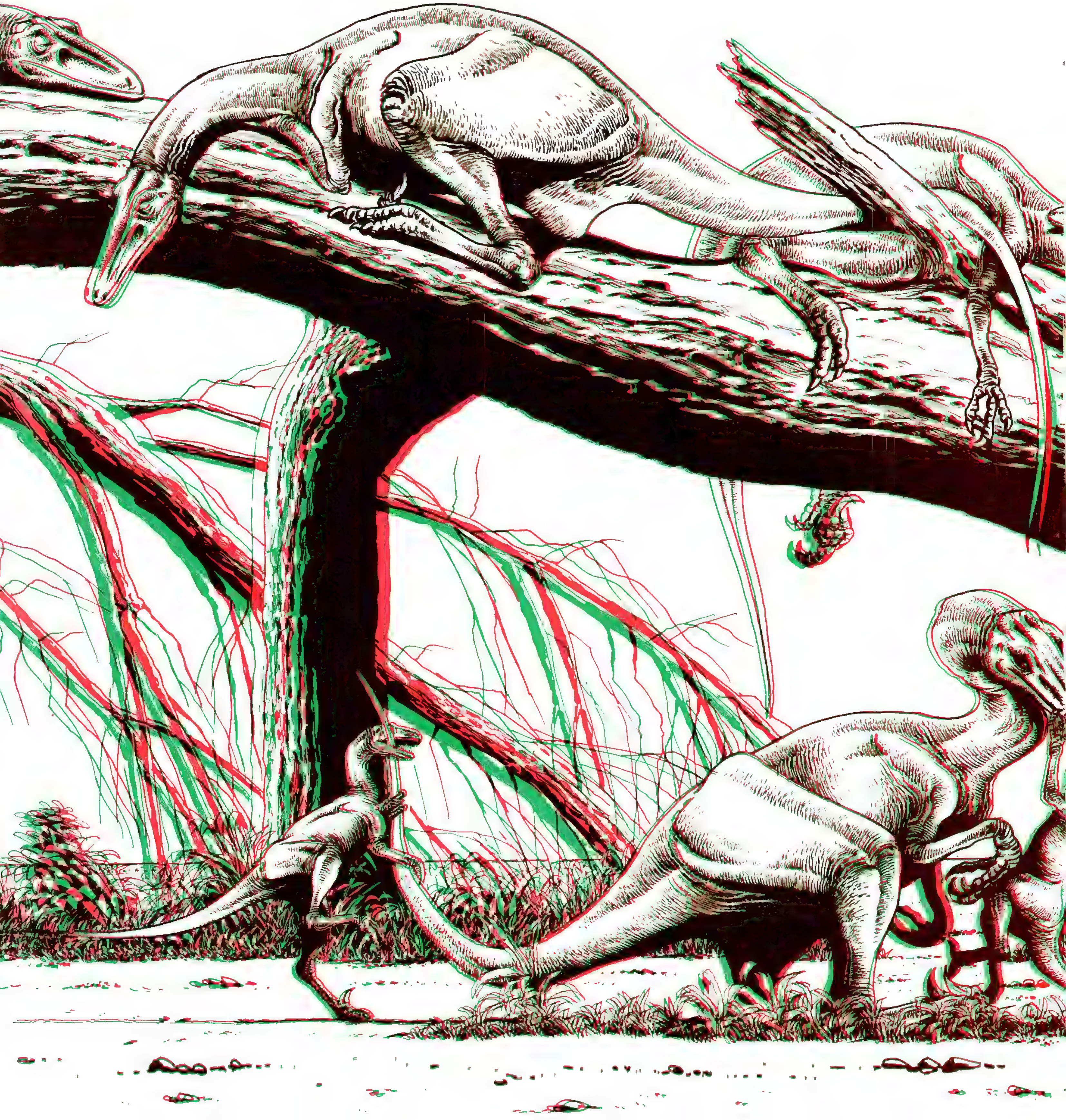


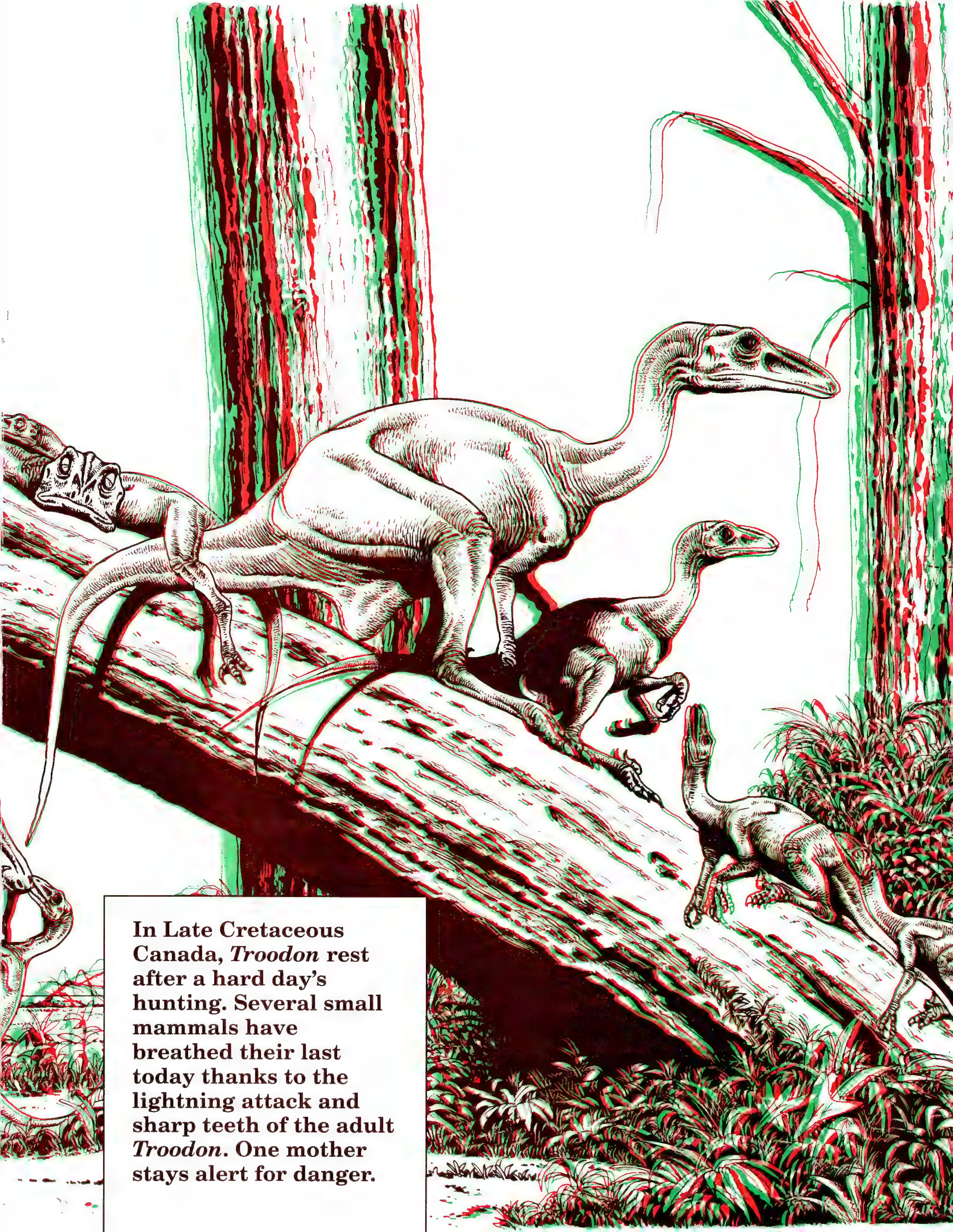
# ARRHINOCERATOPS



# 3-D Gallery 62

## TROODON





In Late Cretaceous Canada, *Troodon* rest after a hard day's hunting. Several small mammals have breathed their last today thanks to the lightning attack and sharp teeth of the adult *Troodon*. One mother stays alert for danger.

# Helping hands

**Long and grasping or short and feeble, dinosaurs used their hands in many different ways.**

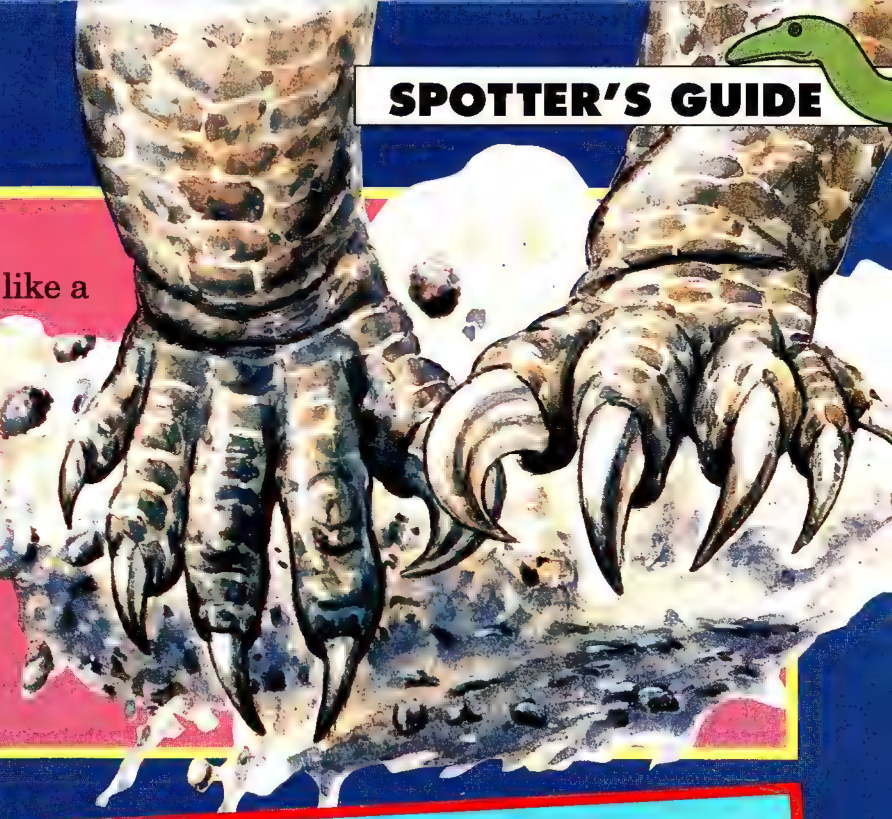
Some dinosaurs were armed to the tops of their fingers with deadly claws. Others used their hands to help them hunt or hold down prey. Dinosaur hands came in a great variety of shapes and sizes, some with only two fingers and some with as many as five.

**HANDS UP!**

*Psittacosaurus* had four long fingers on each hand. It probably used them mainly for walking. But when it spied an inviting tree, it stopped and reared up on its hind legs. *Psittacosaurus* reached up and drew down the tempting branch to within biting distance of its parrot-like beak.

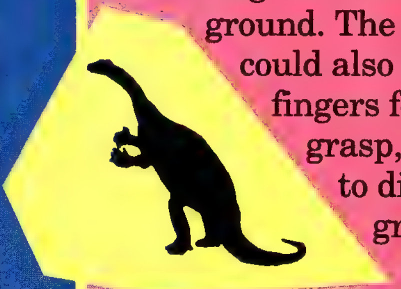
**GRAPPLING IRONS**

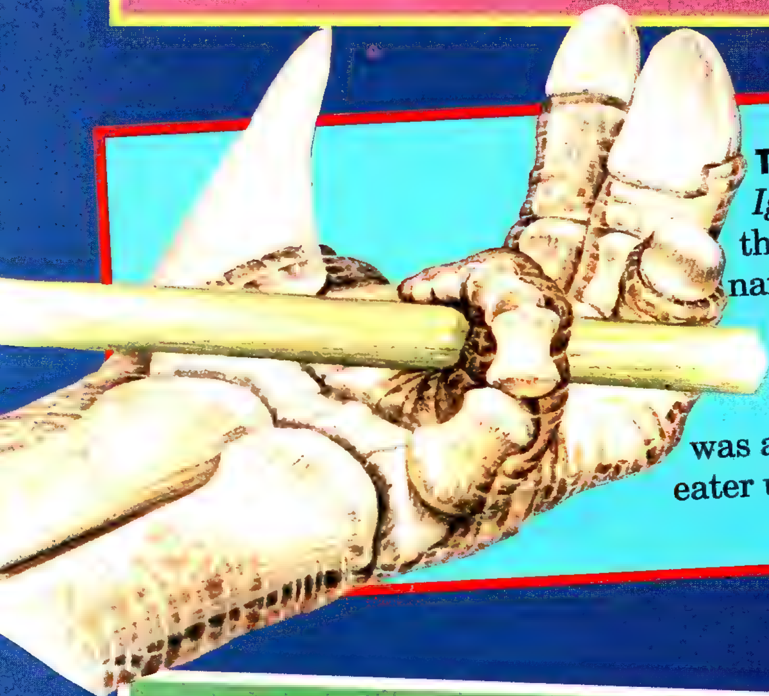
For its size, *Tarbosaurus* had the smallest hands in the dinosaur world. With only two fingers, such feeble hands were no good for fighting but experts think *Tarbosaurus* may have used its claws as hooks to hold on to the ground so it could push against them and heave its heavy body upright. It also used its fingers and claws to grip wriggling prey while it ripped at them with its teeth.



### FLEXIBLE FINGERS

Many early dinosaurs had five fingers, like a human. *Plateosaurus* used its five flexible fingers like toes by bending them back to rest on the ground. The prosauropod could also bend its fingers forwards to grasp, and perhaps to dig into the ground to search for juicy roots.



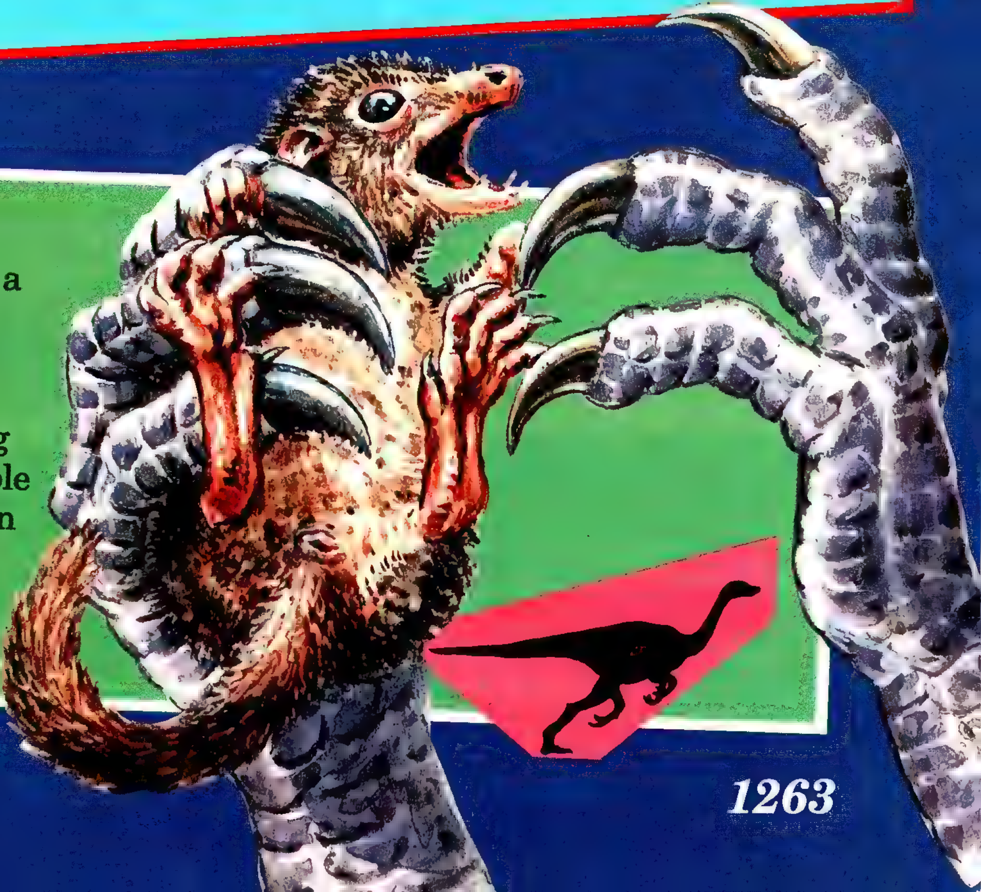


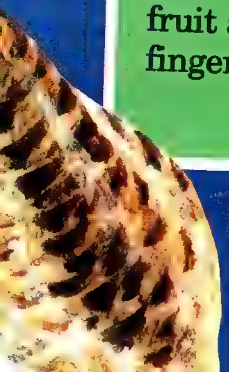
### THUMB THREAT

*Iguanodon* had four fingers and an amazing thumb. The fingers were broad with hoof-like nails which helped the dinosaur to walk. Its fourth finger stuck out at right-angles to its wrist and was used for grasping branches. *Iguanodon*'s thumb was a deadly spike which the plant-eater used to defend itself.

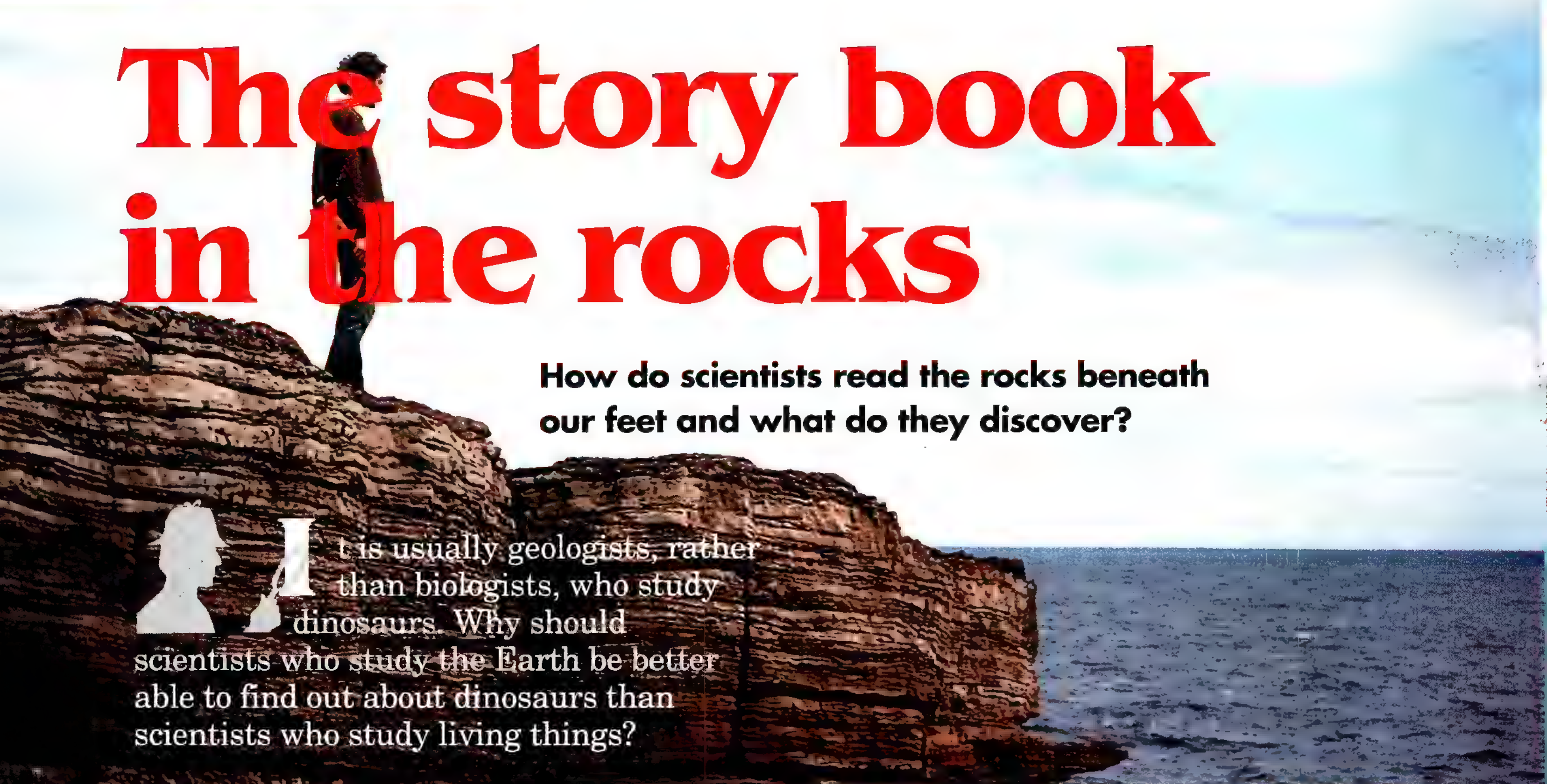
### GOOD GRIPPERS

Intelligent *Dromiceiomimus* was a speedy dinosaur that preyed on small, fast-moving mammals. It had long, three fingered hands which it used to hold its wriggling victim in a firm grasp. It is possible that *Dromiceiomimus* pulled down fruit and berries with its clawed fingers to add to its varied diet.





# The story book in the rocks



**How do scientists read the rocks beneath our feet and what do they discover?**

It is usually geologists, rather than biologists, who study dinosaurs. Why should scientists who study the Earth be better able to find out about dinosaurs than scientists who study living things?

## FOSSIL CLUES

The reason is that dinosaurs are found as fossils, embedded in rocks. Geologists can explain the processes that have turned bones into minerals. They can also tell what conditions were like at the time.

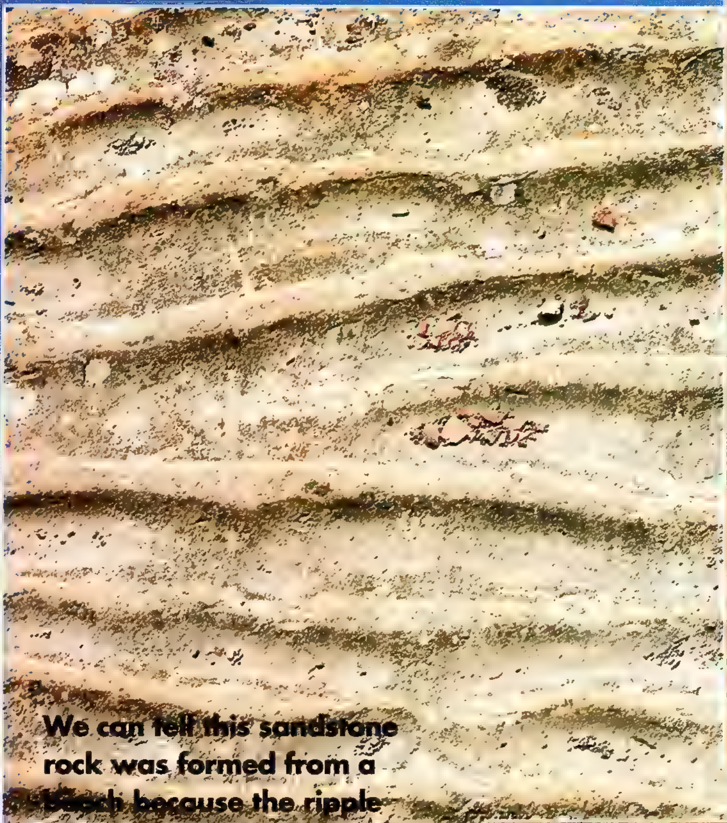
## THE SANDS OF TIME

The rocks that contain fossils are called sedimentary rocks. That means that they are formed from beds of loose material, called sediment, that have built up layer by layer over thousands of years and have later turned to stone.

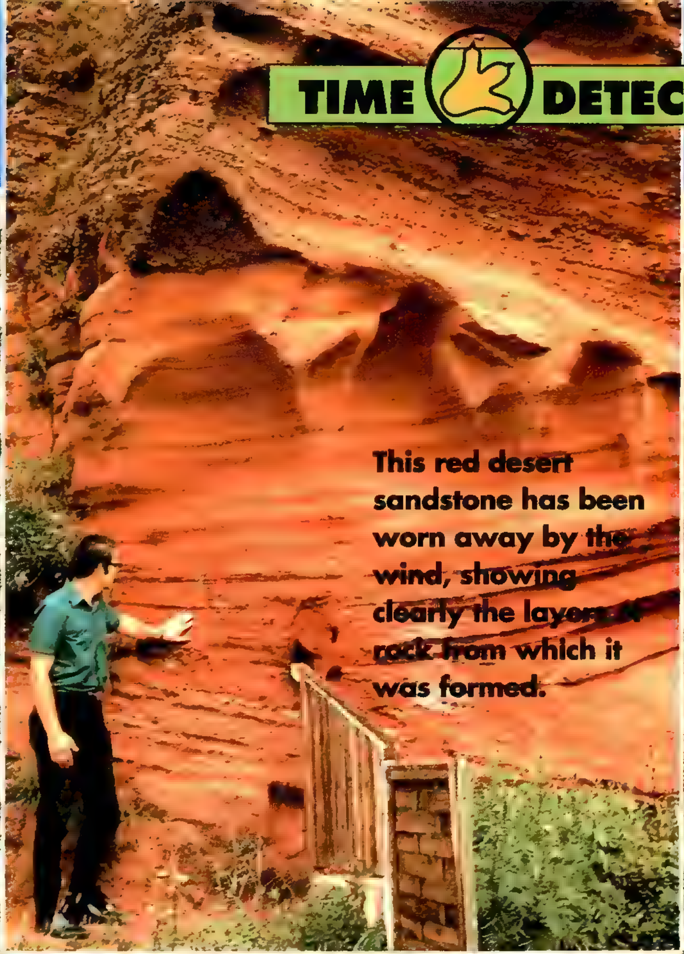
## FUSSY FOSSILS

Some animals are quite fussy about where they live. In a rock we may find a fossil of a shellfish that we know did not live in salt water. We can then tell that these sediments were formed in fresh water – a river, stream or a lake. Geologists call such a fossil a 'facies fossil'.

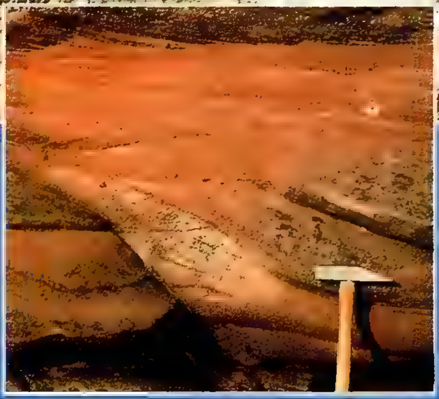
Dangerous work! A geologist searches for fossils on a cliff face.



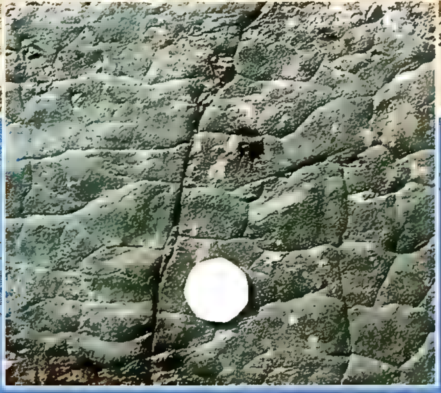
We can tell this sandstone rock was formed from a beach because the ripple marks made by the waves can still be seen.



This red desert sandstone has been worn away by the wind, showing clearly the layers of rock from which it was formed.



These shapes in the sandstone were formed by river currents. We call this 'current bedding'.



Mudcracks preserved in the rock tell us where a pond dried out in the sun.

## FLY-BY-NIGHT FOSSILS

Some species of animals only lived for a very short period of time – maybe a million years or so (that's a short time to a geologist). Fossils of such creatures – called 'index fossils' – can be used for dating the rocks in which they are found. The best index fossils are of those animals that drifted throughout the world's oceans, like ammonites and graptolites.

## SEA SKELETONS

So, in what kinds of rocks do we find dinosaur fossils? Rocks formed under the sea are not a good place to look for fossils of land animals. Because if a dinosaur was washed into the sea the bones would have been scattered before they settled.

## DINOSAUR GRAVES

River siltstones and desert sands are the best place to find dinosaur fossils. If a dinosaur drowned in a river, or was engulfed by a sandstorm, and the body was buried quickly before scavenging animals could get at it, then it had a good chance of becoming a fossil.

# Reading the rocks

**Follow the clues to discover the story hidden in the rocks.**

Here is a cliff face by the seaside. Can we use the rocks to tell us what the landscape was like in the past?

**CLUE 1** The beds are tilted. These rocks would have been laid down in horizontal layers. So there must have been great earth movements since they were formed.

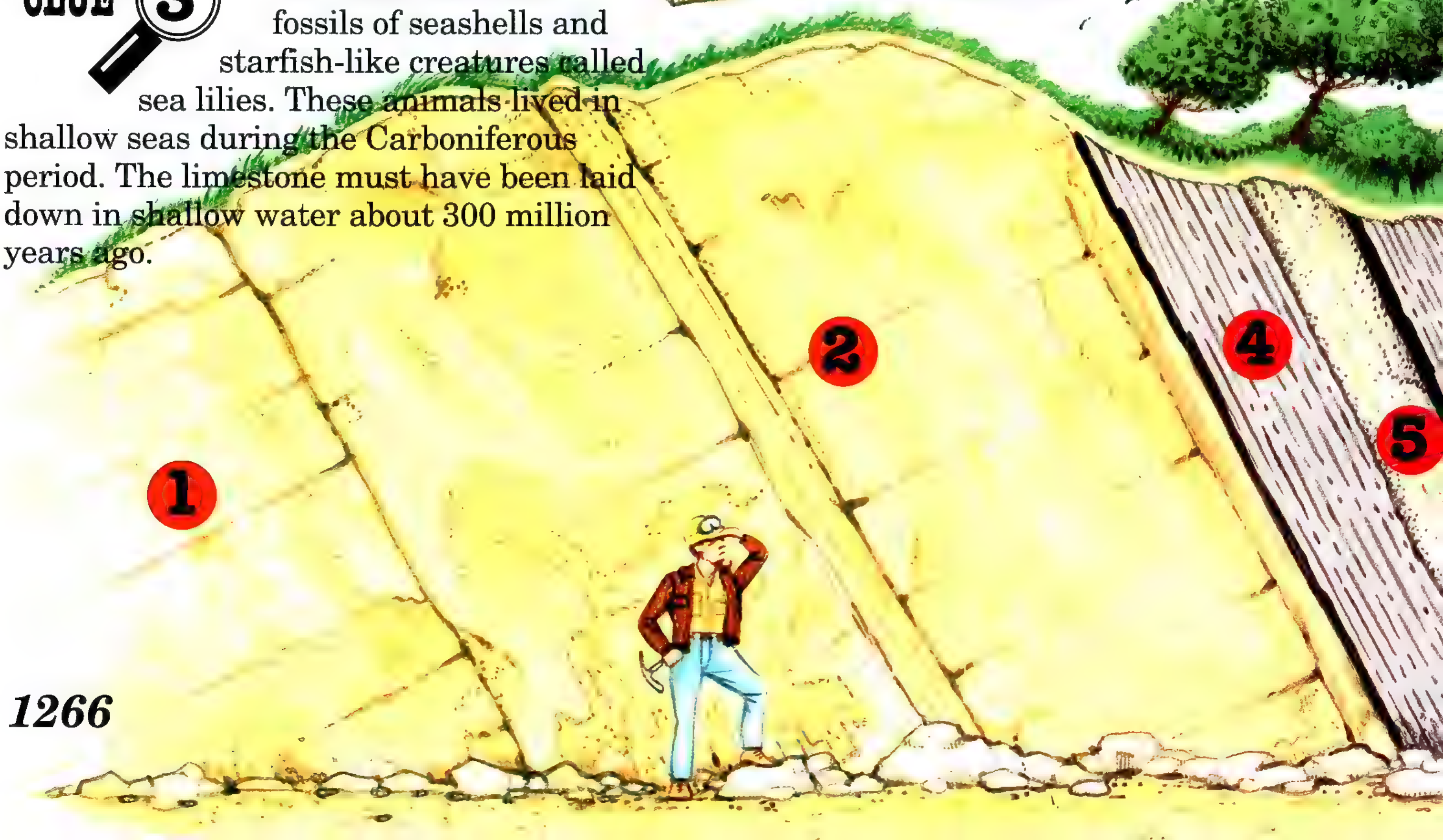
**CLUE 2** The first rock that we come to is a massive limestone. Because it is so thick it must have been formed over a long period of time.

**CLUE 3** The limestone has fossils of seashells and starfish-like creatures called sea lilies. These animals lived in shallow seas during the Carboniferous period. The limestone must have been laid down in shallow water about 300 million years ago.

**CLUE 4** Beds of shale come next. This soft flaky rock is formed from mud. Nearby rivers must have poured mud into the limy sea at this time.

**CLUE 5** Then there is a bed of sandstone. It has current bedding showing that it was deposited by rivers. When this formed, the river must have been building sand banks out into the sea.

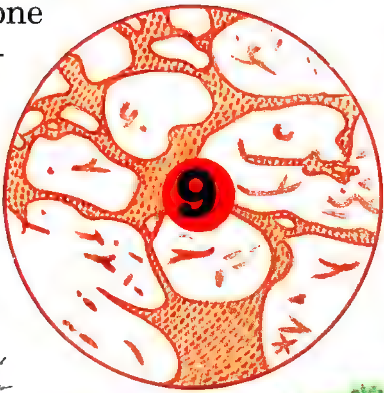
**CLUE 6** A bed of coal on top of the sandstone shows that swampy forests grew on the sandbanks. Tree roots may be seen in the sandstone immediately beneath.

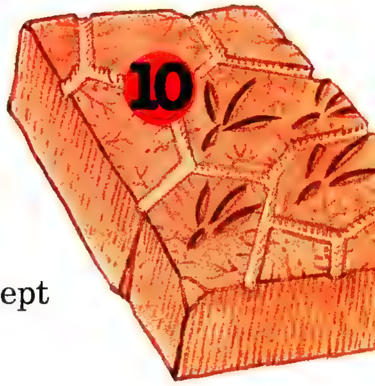


**CLUE 7** The whole sequence of shale-sandstone-coal repeats itself several times. The river must have built sandbanks out into the sea, which were then flooded, and then built up, time and time again.

**CLUE 8** The last rock type is a massive red sandstone. It has huge curved beds which show that this sandstone was formed from sand dunes.

**CLUE 9** Through a magnifying glass we can see that sandstone grains are rounded – rolled about by the wind – and coated with the rusty mineral iron oxide. This means that they were laid down in dry desert conditions.

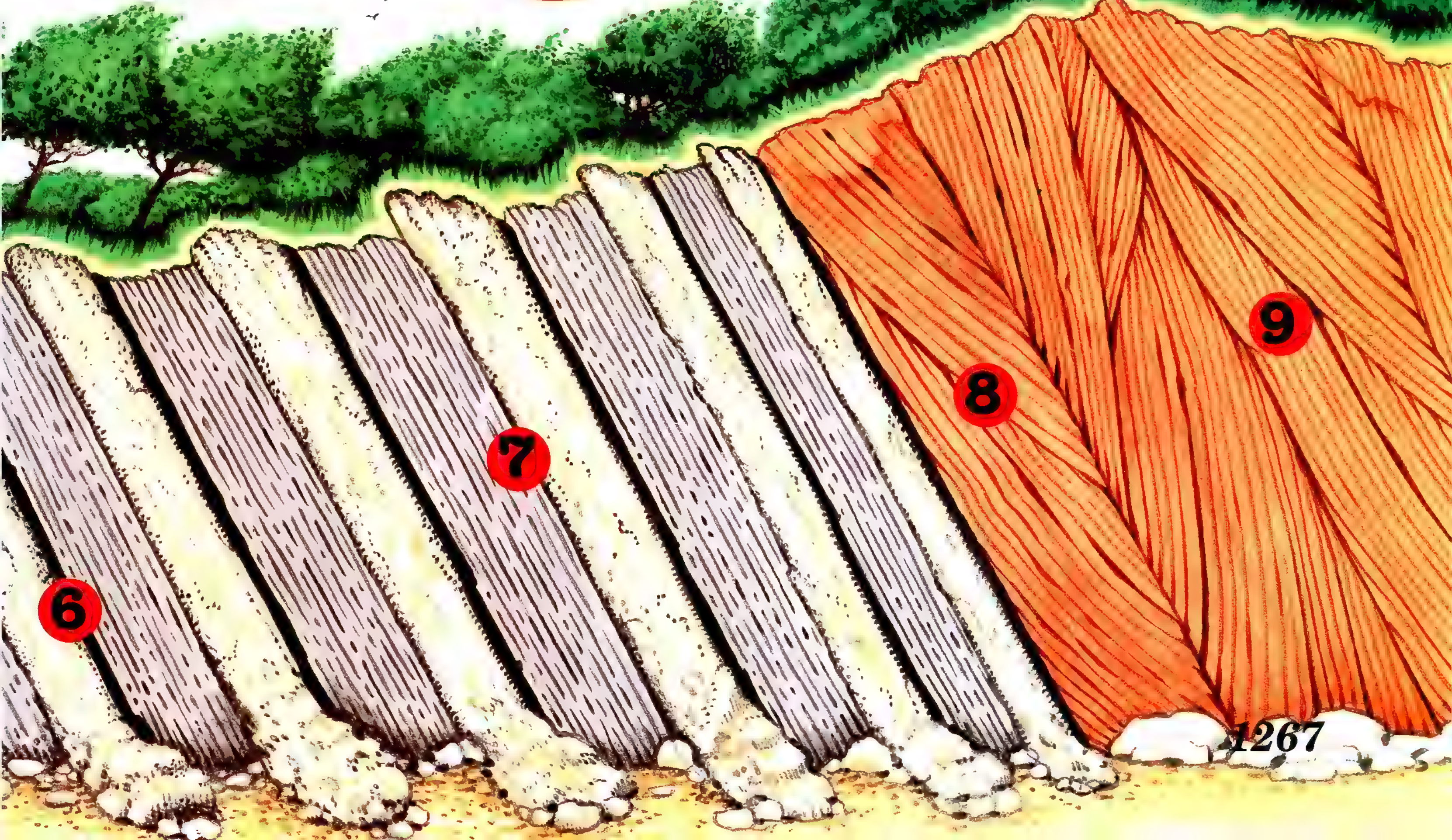




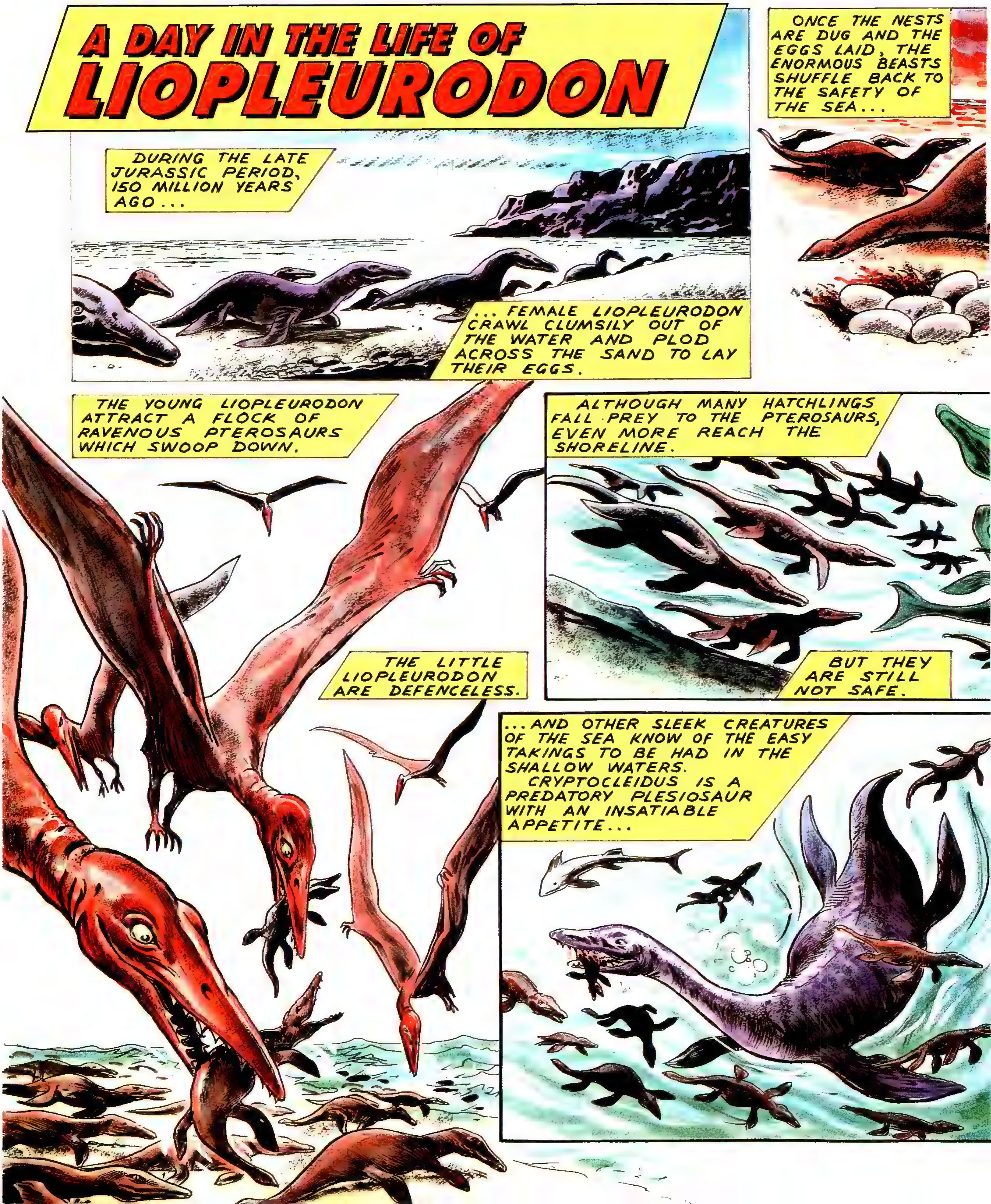
**CLUE 10** A bed of finer siltstone in the middle of the sandstone has mudcracks and reptile footprints. There must have been water holes here that kept drying up.

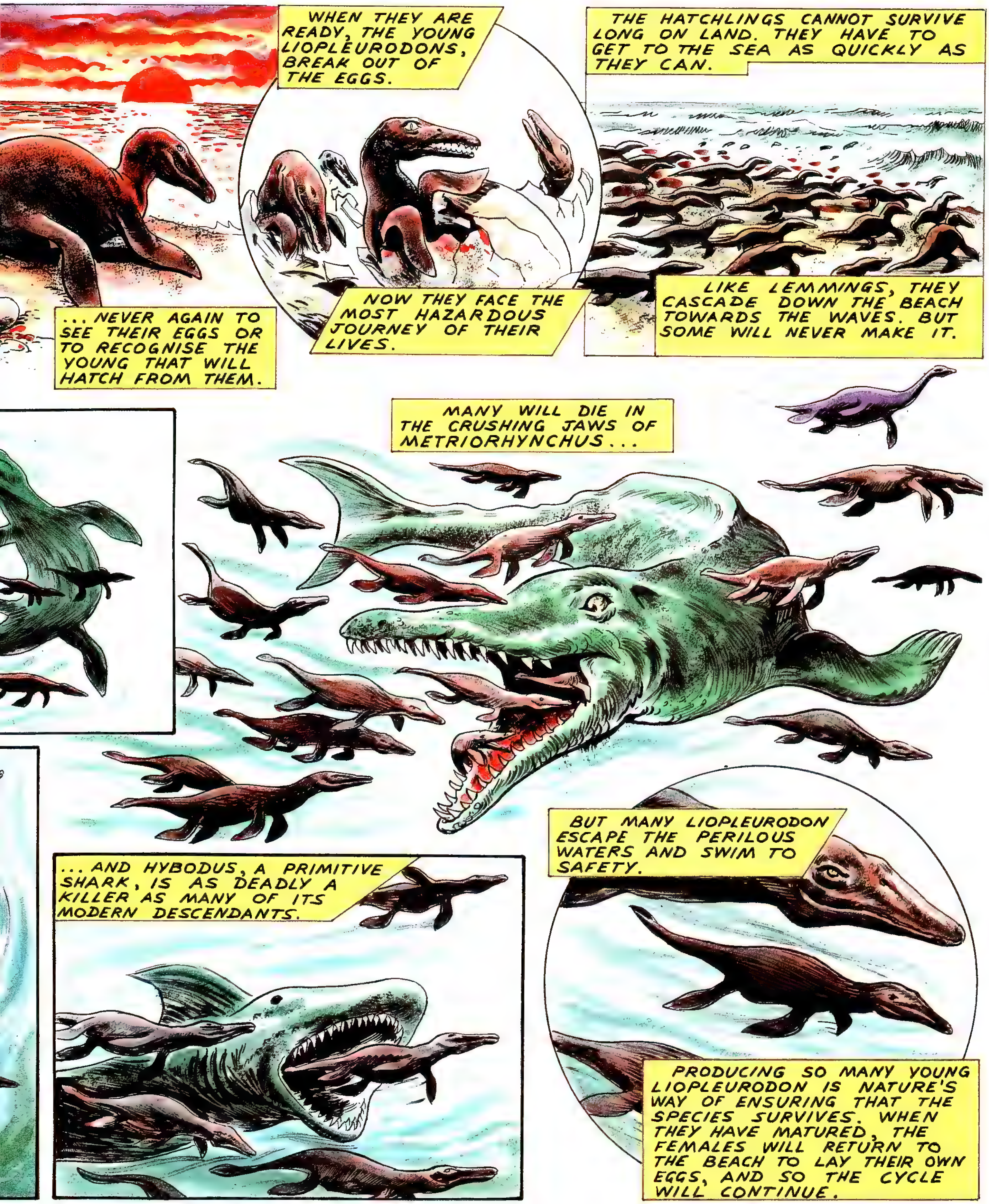
**GOT IT!**

By following the clues in the rocks we can tell that 300 million years ago this area was at the bottom of the sea. A nearby river formed sandbanks that built out into the sea several times. Eventually the sea retreated and the area became a desert. Finally, after a long time, when the sediments had turned to stone, the whole rock sequence was tilted and worn away until it became as we see it today.



# A DAY IN THE LIFE OF LIOPLEURODON


DURING THE LATE JURASSIC PERIOD, 150 MILLION YEARS AGO...
... FEMALE LIOPLEURODON CRAWL CLUMSILY OUT OF THE WATER AND PLOD ACROSS THE SAND TO LAY THEIR EGGS.
ONCE THE NESTS ARE DUG AND THE EGGS LAID, THE ENORMOUS BEASTS SHUFFLE BACK TO THE SAFETY OF THE SEA...
THE YOUNG LIOPLEURODON ATTRACT A FLOCK OF RAVENOUS PTEROSAURS WHICH SWOOP DOWN.
THE LITTLE LIOPLEURODON ARE DEFENCELESS.
ALTHOUGH MANY HATCHLINGS FALL PREY TO THE PTEROSAURS, EVEN MORE REACH THE SHORELINE.
BUT THEY ARE STILL NOT SAFE.
...AND OTHER SLEEK CREATURES OF THE SEA KNOW OF THE EASY TAKINGS TO BE HAD IN THE SHALLOW WATERS.
CRYPTOCLEIDUS IS A PREDATORY PLESIOSAUR WITH AN INSATIABLE APPETITE...


...NEVER AGAIN TO SEE THEIR EGGS OR TO RECOGNISE THE YOUNG THAT WILL HATCH FROM THEM.
WHEN THEY ARE READY, THE YOUNG LIOPLEURODONS, BREAK OUT OF THE EGGS.
NOW THEY FACE THE MOST HAZARDOUS JOURNEY OF THEIR LIVES.
THE HATCHLINGS CANNOT SURVIVE LONG ON LAND. THEY HAVE TO GET TO THE SEA AS QUICKLY AS THEY CAN.
LIKE LEMMINGS, THEY CASCADE DOWN THE BEACH TOWARDS THE WAVES. BUT SOME WILL NEVER MAKE IT.
MANY WILL DIE IN THE CRUSHING JAWS OF METRIORHYNCHUS...
...AND HYBODUS, A PRIMITIVE SHARK, IS AS DEADLY A KILLER AS MANY OF ITS MODERN DESCENDANTS.
BUT MANY LIOPLEURODON ESCAPE THE PERILOUS WATERS AND SWIM TO SAFETY.
PRODUCING SO MANY YOUNG LIOPLEURODON IS NATURE'S WAY OF ENSURING THAT THE SPECIES SURVIVES. WHEN THEY HAVE MATURED, THE FEMALES WILL RETURN TO THE BEACH TO LAY THEIR OWN EGGS, AND SO THE CYCLE WILL CONTINUE.

# Improve and test your knowledge with... FACT FILE

Fascinating facts
to read and
10 fun questions
to answer!

### [illegible]

We have mentioned before that dinosaurs have been used on postage stamps. Very recently, the American postal service produced a set of stamps which included Brontosaurus. This caused a great deal of correspondence because, as we all know, the real name for Brontosaurus should be...Apatosaurus!

**1** *Arrhinoceratops* had:
a) no nose horn
b) a small nose horn
c) a large nose horn

**2** Which dinosaur had only two fingers?
a) *Tarbosaurus*
b) *Dromiceiomimus*
c) *Plateosaurus*

**3** Geologists learn about dinosaurs by studying:
a) living animals
b) trees and flowers
c) rocks and fossils

**4** *Basilosaurus* was mistakenly named:
a) king reptile
b) king mammal
c) king prawn

**5** *Aepyornis* is called the:
a) elephant bird
b) brain bird
c) big bird

**6** *Ictitherium* was one of the first:
a) hyenas
b) bears
c) dogs

**7** *Liopleurodon* laid lots of eggs to try and:
a) feed hungry sea creatures
b) ensure the species survived
c) to get in the record books

**8** The Jurassic Period was named after:
a) the film 'Jurassic Park'
b) the Jura Mountains
c) the flying reptile, *Jurapteryx*

**9** *Iguanodon* had an amazing:
a) head frill
b) big toe
c) thumb

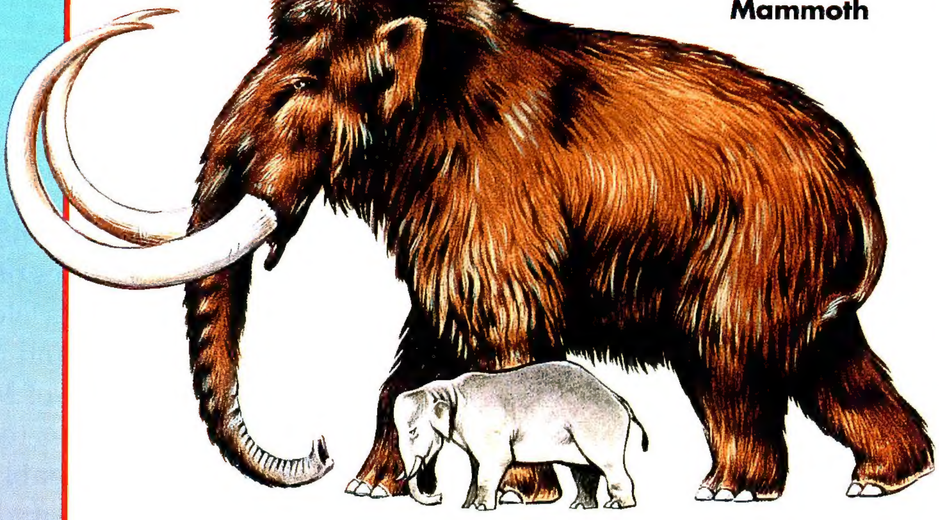
### Dine like a dino

Today, there are some people who eat the same food that dinosaurs did! In the northern USA and southern Canada, young fern fronds are sold as vegetables in early spring. Some are sold fresh, others are canned and sold in stores. These young curled-up fronds are called 'fiddle heads' and lots of people consider them a dining delicacy.

### Cornish tomb

Cromhall quarry is a famous 'fissure site' in south-west England. Some of the oldest known mammal fossils have been found there. A fissure is a crack in the rocks. If small creatures fall down a fissure,they usually can't get out. They become buried in the sediment that is washed down into the cracks when it rains, creating the perfect conditions for preserving bones.

## As small as an elephant?

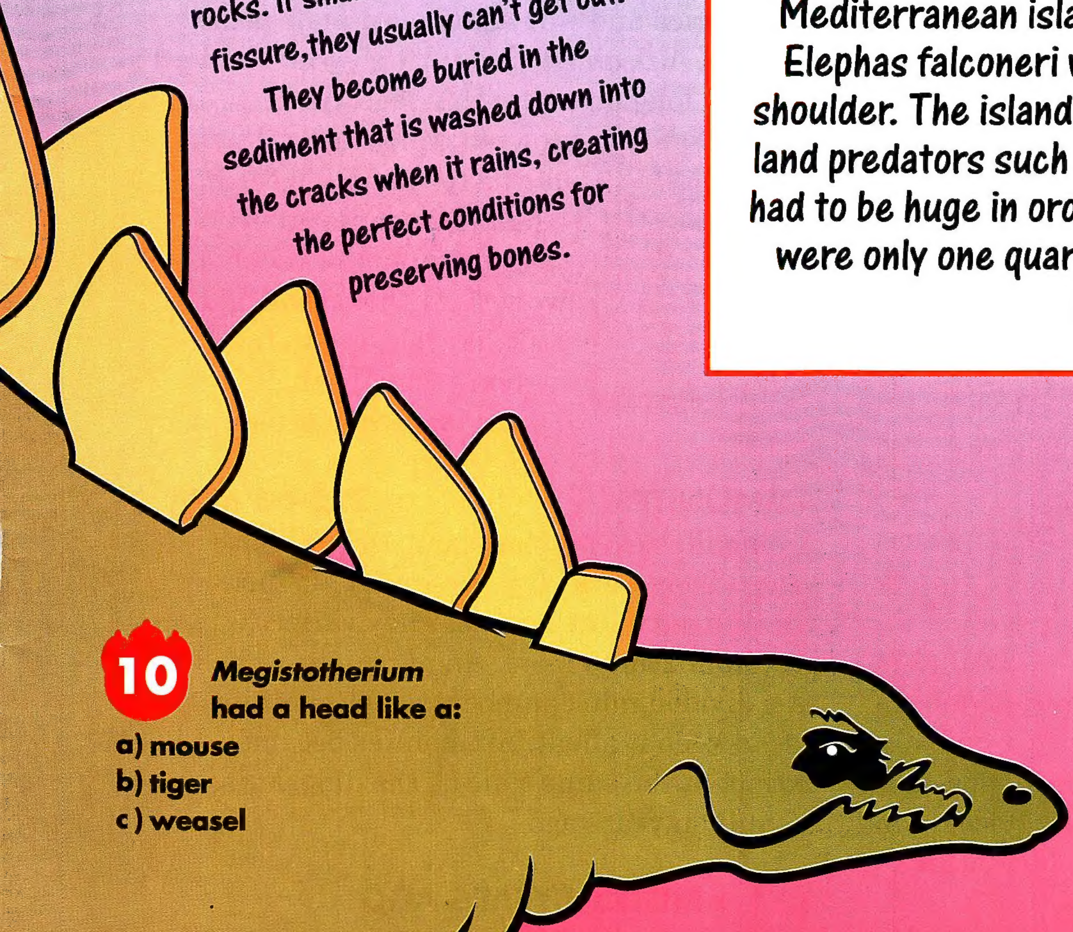


Elephas falconeri

Elephants may have evolved their large size as a defence against predators. This idea is supported by the discovery that dwarf elephants lived on Mediterranean islands such as Sicily and Malta. Elephas falconeri was only one metre tall at the shoulder. The islands were largely free of any large land predators such as lions so elephants no longer had to be huge in order to be safe. On average, they were only one quarter the size of their mainland ancestors.

### Fish on a bicycle

Coelacanth, the large scaly fish which scientists thought had died out millions of years ago, was discovered off the coast of South Africa this century. They later found that the people on the Comoros Islands had been catching them for years! Fishermen were using the scaly skin to roughen the inner tubes of bicycle tyres when mending a puncture!



**10** ***Megistotherium* had a head like a:**

**a) mouse**
**b) tiger**
**c ) weasel**

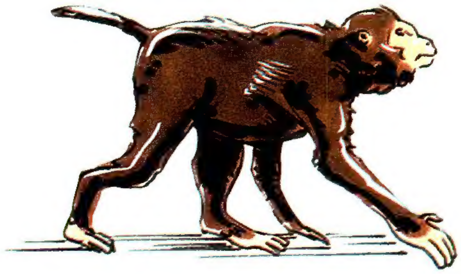
**Answers to the questions on inside back cover**

**ACANTHODES** **400-270 MYA**

Eel-like *Acanthodes* (ak-an-thoh-dees) lived from the Early Carboniferous to the Early Permian Period in the waters of the northern continents and Australia. This spiny herring-sized fish had a small toothless head and stud-like scales on its body. Strong spines stood up from the edge of its fins. It chased after jawless fishes and small freshwater invertebrates. *Acanthodes* was one of the first known vertebrates (animals with backbones) to have jaws.

**AEGYPTOPITHECUS** **28 MYA**

A small ape about the size of a gibbon, *Aegyptopithecus* (ee-gip-toh-pith-i-cus) lived in the thick forest which once covered the desert regions of Egypt. Low-browed *Aegyptopithecus* had a snout which jutted out below bony eye sockets. It was an ancestor of the modern ape.



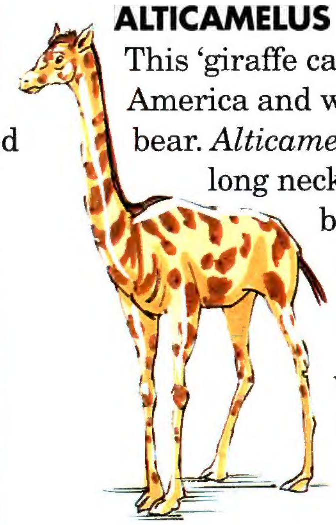
**AELLOPOS** **140 MYA**

A flat ray fish with wing-like fins, *Aellopos* (ee-lop-oss) was about 1.5m long. It had a skeleton of tough gristle (cartilage) and teeth strong enough to crush shellfish. It swam in the seas of Europe in the Late Jurassic Period.

**AEPYORNIS** **1.8 MYA**

The bones of this big flightless 'elephant bird' were found in the swamps of Madagascar. *Aepyornis* (ee-pie-orn-is) was probably the heaviest of all birds and weighed as much as three ostriches. *Aepyornis maximus* means 'greatest of all the high birds'.

**ALTICAMELUS** **10 MYA**



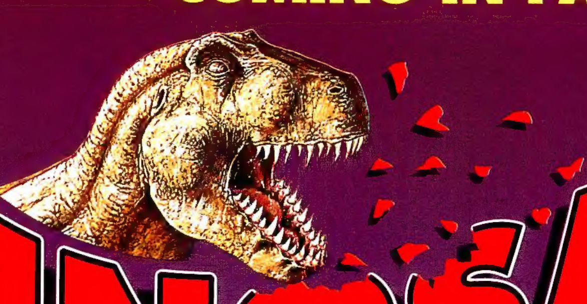
This 'giraffe camel' lived in North America and was as tall as a male polar bear. *Alticamelus* (al-ti-ca-mey-lus) had a long neck and thin legs. As it browsed on leaves and twigs at the top of high trees it had to be on its guard against predators such as wolves. At the bottom of its stilt-like legs it had hard hoofs which helped it to run fast when attacked.

**AMMONITES** **225-66 MYA**

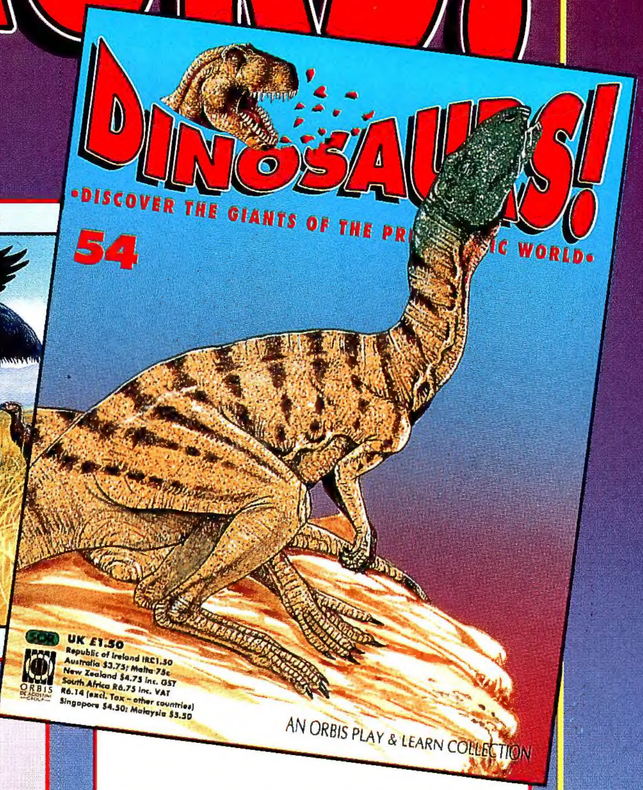
Ammonites existed for about 160 million years. They were very successful molluscs which lived in the oceans. They varied in size from 2cm to 2.5m. An ammonite's shell was divided into chambers which contained gas to keep it afloat. Ammonites became extinct at the same time as the dinosaurs, 66 million years ago.

**MYA = MILLION YEARS AGO**

# COMING IN PART 54 OF



# DINOSAURS!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•DISCOVER THE GIANTS OF THE PREHISTORIC WORLD•
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UK £1.50
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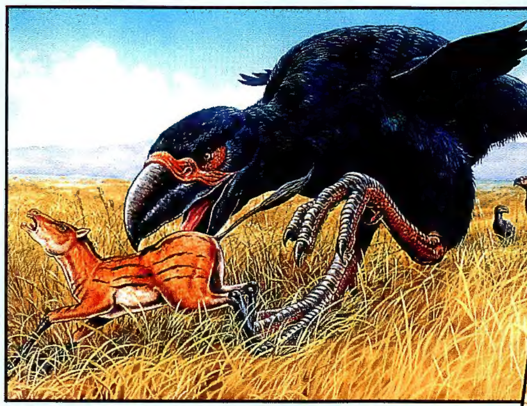
**Find out about the fastest growing structure in the animal world in SPOTTER'S GUIDE. See how Darwin discovered evolution in HISTORY IN PICTURES.**



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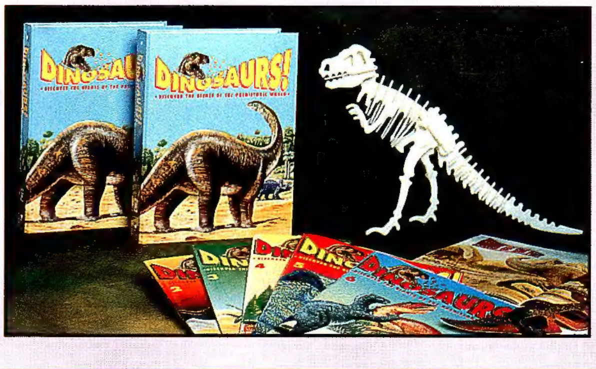

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## PLUS

**More amazing monster facts in IDENTIKIT and 3-D GALLERY GIANTS OF THE PAST A-Z OF PREHISTORIC ANIMALS**

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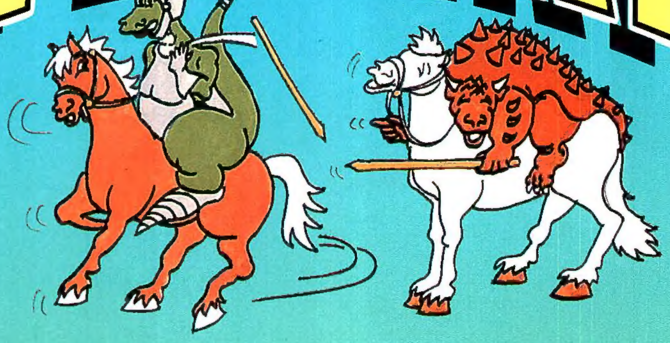
**ANSWERS TO FACT FILE QUESTIONS:** 1.b 2.a 3.c 4.a 5.a 6.a 7.b 8.b 9.c 10.b

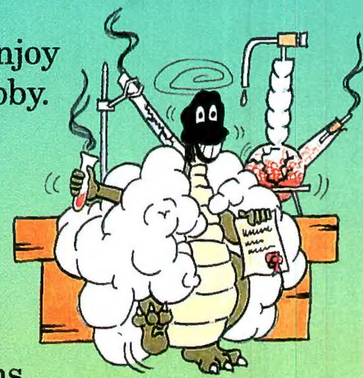
# ASK THE EXPERT

**Dr. David Norman of Cambridge University answers your dinosaur questions**



## How can you become a palaeontologist?

So many of you ask about this that I am happy to explain again. First you need to study science at school. If you do well, you can go to university to study Geology and Zoology. These subjects allow you to study palaeontology. Not all people do this; some enjoy palaeontology as a hobby.



## How did time periods get their names?

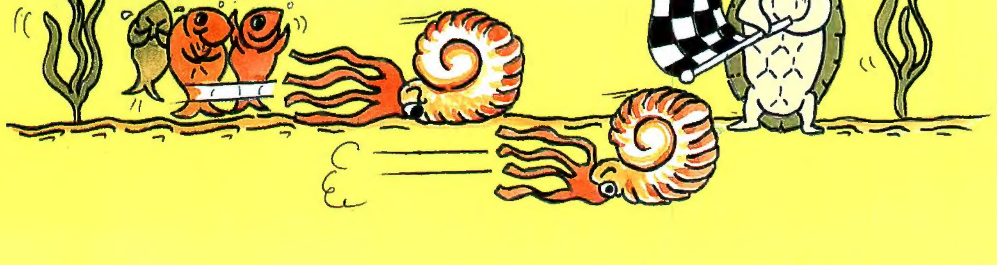
The names were often chosen for local reasons. The Jurassic Period was named after the Jura mountains in France. Devonian rocks are found in Devon, England, and the Silurian is named after the Silures, a Welsh tribe that lived in the region dominated by this age of rock. The Cretaceous Period was named from 'creta' meaning chalk, and the Carboniferous Period is named after the carbon or coal found in rocks of this time period.

## Which dinosaur had the most armour?

I do not really know. My best guess would be one of the ankylosaurs such as *Euoplocephalus*. Unfortunately we do not often find complete dinosaurs, so it is impossible to be certain which had the most armour.

## Were shellfish able to swim?

The simple answer is yes! But only a few. Ammonites probably swam by jet propulsion, squirting water out of a nozzle under the head. Scallops today, like their fossil ancestors, can swim to escape from predators such as starfish. They swim by clapping their shells together. To see these animals swimming along is a truly amazing sight. Very few other shellfish were able to swim to escape predators.



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